

A Database Publication

# electron

Vol. 6 No. 6 March 1989 £1.25

## user

## TRIVIA TEST

Create your  
own quiz  
programs

### UTILITIES

Teach your Electron to write poetry  
DFS directory structure revealed

### FEATURES

Search and replace variables  
Print numbers in any base

### GAMES

Taktiks – two-player board game  
Sprog – caveman arcade adventure

**REVIEWS**  
Advanced File Manager,  
Repton Infinity,  
Last Ninja,  
Zenon



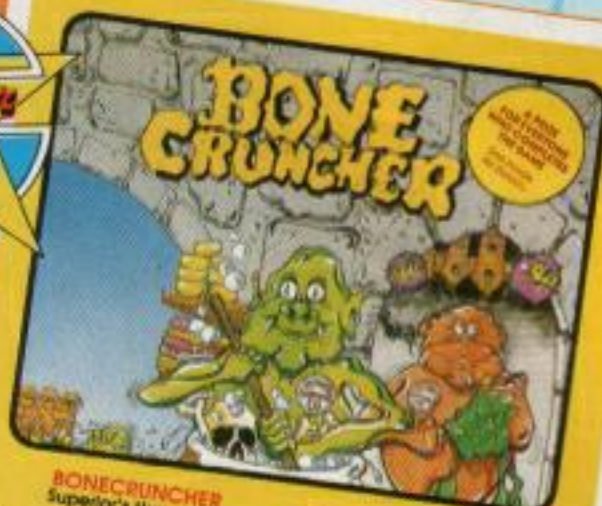
# PLAY IT AGAIN SAM

# 7

NOW ALSO  
AVAILABLE  
FOR THE  
ELECTRON

## FIRETRACK

**FIRETRACK**  
Electric Dreams' Smash Hit  
Micro User gave Firetrack a  
maximum .... rating and  
enthused that "Firetrack is for  
the player who thrives on  
danger, a plot with nerves of  
steel and lightning reflexes".  
This superbly addictive game,  
with beautifully detailed  
graphics, is now available  
again for the BBC Micro and is  
available for the first time ever  
for the Electron.

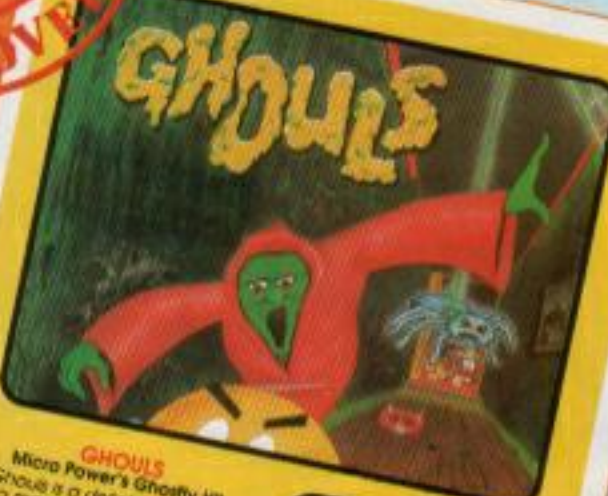


### BONECRUNCHER

Superior's Humorous  
Soap Opera  
Play the part of Bone, a green  
dragon, who collects skeletons  
to make soap...but watch out  
for the spiders, monsters and  
glocks!  
With smooth four-directional  
scrolling and often fiendish  
puzzles, Bonecruncher will  
delight game players of all  
ages. Another sure-fire hit!  
-Micro User



**SNAPPER**  
Acornsoft's Arcade Classic  
"Snapper is an excellent  
reproduction of the popular  
arcade game. Acornsoft have  
really excelled themselves yet  
again with Snapper. The more  
you play the fruit are of very  
realistic. Summary: Totally  
excellent, classic game.  
Brilliant! A & B Computing



**GHOULS**  
Micro Power's Ghostly Hit  
"Ghouls is a delightful game set  
in a mansion on top of a  
creaky hill. The graphic quality  
of Ghouls is impressive. The  
sound in Ghouls is superb.  
Some of the noises are creepy,  
and would be well-placed in a  
horror film! Ghouls is a great  
game. -Acorn User



## PLAY IT AGAIN SAM 7 for the BBC Micro and Acorn Electron

Superior Software has combined three classic hits from other software houses (one new to the Electron) with one of its own top hits. The result is a top quality four-game compilation that combines variety with great value for money.

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Each copy of Play It Again Sam 7 contains a PLAY IT AGAIN SAM COMPETITION card.

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Write your own arcade smashes using the

# ARCADE GAME Creator

Arcade Game Creator is a suite of programs for the Electron and BBC Micros. Taken from the pages of *Electron User*, it lets you into the secrets of writing fast-action arcade games, and provides you with a number of utilities to make design and programming easier.

Among the programs are:

- A Mode 5 sprite editor that lets you design your own multi-coloured characters.
- A selection of fast print routines that will move sprites both in front or behind other objects on the screen.
- Map generators that will squeeze a Mode 5 screen into 8 bytes!
- Scrolling maps.
- Score update and printing routines. . . . and much, much more.

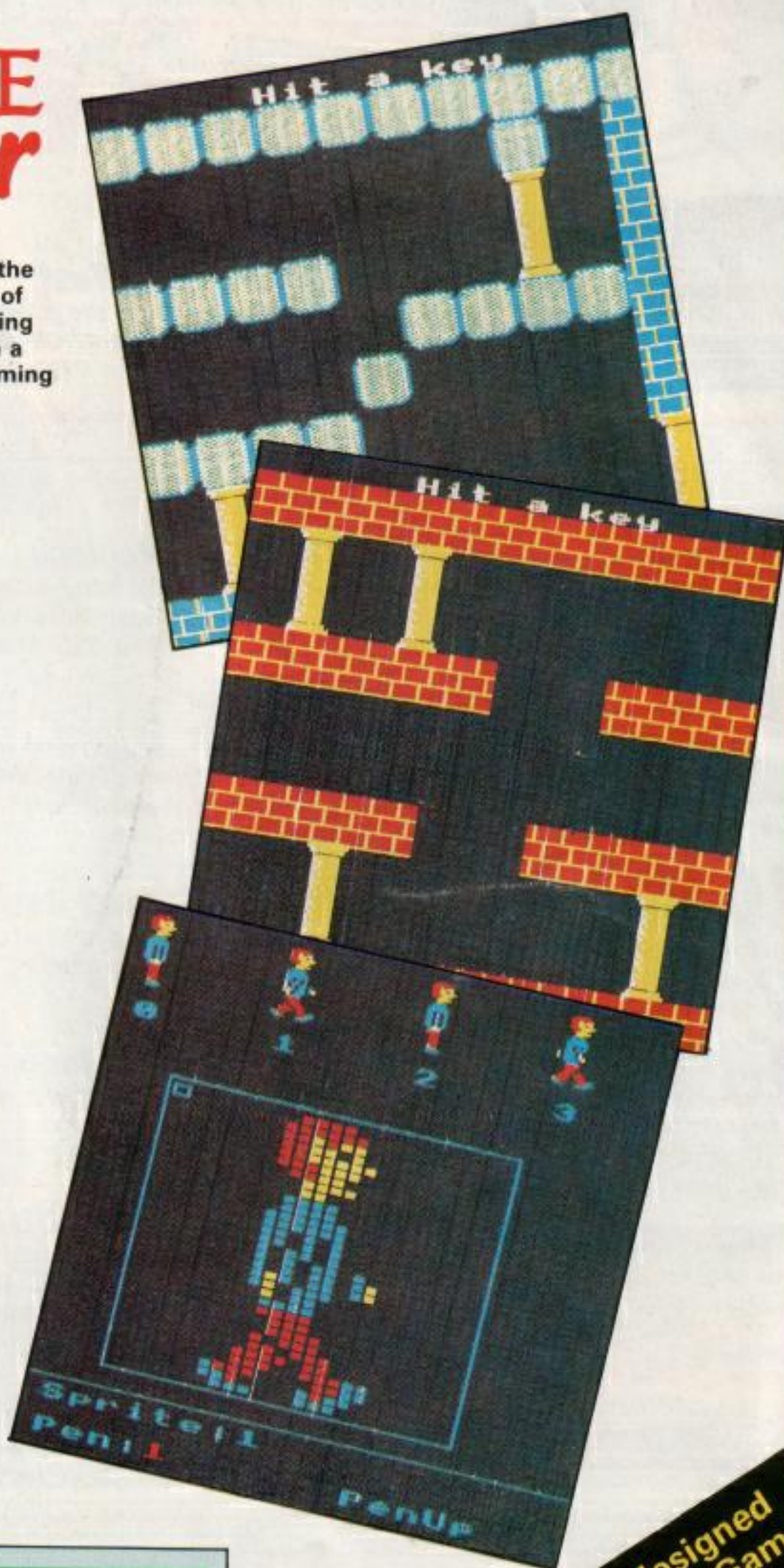
To help you make the most of the Arcade Game Creator, you will also get a comprehensive manual based on the original series.

Written in an easy to read style and with many illustrations and screen shots, it contains all the information you need to create and animate sprites, to design back-grounds and to link the two together into a complete arcade game.

If you are an aspiring games programmer, this is an offer you simply cannot afford to miss!

## Arcade Game Creator

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using Arcade Game  
Creator

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# electron user NEWS



## Firetrack speeds in for the Electron

LATEST compilation from Superior (0532 459453), *Play It Again Sam 7* includes an Electron conversion of Electric Dreams' Firetrack.

"Because of the graphics and the speed, a lot of people thought it was impossible to produce Firetrack for the Electron", said Superior's Steve Hanson.

"We are very pleased with the Electron version. It has the multi-coloured background and is very fast. There are some differences of choice in the way the game is played and no music, but we don't think this will affect players' enjoyment".

Firetrack, one of the top BBC Micro games of 1987, is teamed with Bone Cruncher, Snapper and Ghouls in *Play It Again Sam 7*, price £9.95.

Planned for release late March or early April is *Play It Again Sam 8*. This includes *Winter Olympiad '88* - the first time Superior has included a Tynesoft game in its compilations.

Steve Hanson has welcomed the Tynesoft connection, which he sees as a good way to keep up interest in the Electron. Colin Courtney of Tynesoft (091-414 4611) said there could be a possibility of further cooperation in the future, but at present he sees the *Olympiad* deal as a one-off.

*Play It Again Sam 8* will also include *Quest*, *Around the World in 40 Screens* and *Mr. Wiz*. Price: £9.95.

## Electron graphics get the message across

BUSINESSMAN Peter Woolsey built his television advertising company by using Electron-generated graphics. He believes the best place to hit people with advertising is when they are collecting their cash and hopes to have his Media 2000 service on show in 1,000 sub post offices by the end of the year. When he started his business, he needed

graphics to get his clients' advertising messages on screen to be watched by post office queues and he chose the Electron for the job.

He is also installing his screens in public houses where viewers are susceptible to advertising and has plans to put large multi-screen units into shopping centres incorporating new double sided television displays.

With smaller displays, information is distributed at regular intervals on disc. Programs with more than 15 advertisements are sent via modems and ITV Oracle.

"When we install a system we do not charge anything", he said. "Our retailers get a percentage of the income from the advertisers and they end up with their



A Media 2000 multi screen panel

own local television station.

"It is far more effective to advertise when people are collecting their cash than on TV in their homes when they may have another 10 hours, including sleep, before they are able to buy".

"I have been extremely pleased with the graphics we have produced on our Electrons. Although I am currently looking into using other computers, I intend to have my Electrons running until the year 2000".

CHEATING has paid off for 77 Electron User readers who were successful in our November competition.

First out of the sack with the correct answers on four world famous cheats was Peter Goodson of Stansted. He wins any five games of his choice for his Electron, plus two volumes of *Cheat It Again Joe* to help him past those tricky bits.

Second place goes to A. Young of Paisley who will soon be receiving any three games plus the useful cheats from Impact.

To get new interest out of old games, 75 other winners will receive both volumes of *Cheat It Again Joe*.

Correct answers were: 1, Maradonna; 2, Lester Piggott; 3, Guinness; 4, John McEnroe.

## Aid for the autistic

THE National Autistic Society will benefit to the tune of £50,000 if firms in the computer games industry hit their 1989 charity target.

Its annual appeal was launched at the industry dinner in London with £15,000 being pledged on the night. Organisers have been encouraged by this flying start and are now calling for titles to be included in a charity games compilation.

There are also plans for a Day of Action on May 4 when companies will be asked to undertake fund-raising efforts.

## The Bronte break

WHAT is the connection between Ilkley Moor, the Bronte country and the Acorn Electron? The answer is an interesting summer break for Electron users.

Bradford & Ilkley Community College is offering two summer courses in creative computing, combining a series of lectures with the chance to visit Yorkshire beauty spots and tourist attractions.

Course tutor Colin Sutton who is a full time lecturer at the college, says: "These are not just boring computer courses but something different with the emphasis on being creative and imaginative with a computer."

"They are ideal for beginners or those with a little knowledge, particularly of the Electron, BBC Micro, Master 128 and Compact computers".

The week-long courses include three full days and three half days of tuition with excursions to tourist attractions organised on the free half days.

They run from July 8 to 15 and from July 15 to 22. Accommodation is on campus and the courses cost £185.52.

Full details can be obtained from The Course Director, Bradford Summer School, Bradford & Ilkley Community College, Great Horton Road, Bradford, West Yorkshire BD7 1AY.



# Gallup Software Chart



THIS MONTH	LAST MONTH	TITLE (Software House)	COMMENTS	PRICE
1	1	FRANKENSTEIN 2000 <i>Atlantis</i>	Still topping the chart is this mixture of Inner Space, Fantastic Voyage and things that go bump in the night. Well worth the money.	1.99
2	4	INDOOR SOCCER <i>Atlantis</i>	If you have tired of the outdoor variety it is probably time to go for the indoor version. Not the best football implementation though.	1.99
3	3	JOE BLADE 2 <i>Players</i>	The graphics are excellent and the game very playable. The puzzle screens are difficult, but this is a superb sequel and will keep you busy for hours.	1.99
4	•	SMASH & GRAB <i>Blue Ribbon</i>	Back in the Top 10 is this budget title. Give this one a go if you are feeling especially villainous. Nothing new is involved, but it's very playable.	1.99
5	10	VIDEO CLASSICS <i>Firebird</i>	A budget collection of some simple and fun games. This title will keep reappearing in the charts. Definitely cheap and cheerful.	1.99
6	2	COMMANDO <i>Encore</i>	Excellent value and one you should certainly add to your collection if you have not already done so. This shoot-'em-all is what you would expect.	2.99
7	•	LAST NINJA <i>Superior</i>	Highest new entry this month – you can read the review in this issue. An excellent game if you can ignore the historical inaccuracies.	9.95
8	•	EXILE <i>Superior</i>	Returning to the charts this month is this mammoth game. There is a massive cave system to work through and it will keep you busy for days.	12.95
9	•	STRYKER'S RUN <i>Blue Ribbon</i>	One of the old Superior games now released with CDS under the Blue Ribbon label. If you don't have the original you must buy this one.	2.99
10	•	CITADEL <i>Blue Ribbon</i>	The second of these re-releases and yet another classic of its type. If you are new to the Electron buy it, you won't be disappointed.	2.99
11	•	REPTON <i>Blue Ribbon</i>	The original little green monster. He has popped on to the screen in various guises and in different settings since, but this is the original.	2.99
12	7	PERCY PENGUIN <i>Blue Ribbon</i>	Not quite in the same league as the other Blue Ribbon/Superior releases, but fun, nice looking and very enjoyable to play.	1.99
13	15	MR WIZ <i>Blue Ribbon</i>	Mr Wiz is lost again and needs you to lead him around his garden collecting cherries while avoiding the dangers.	1.99
14	•	CHUCKIE EGG <i>A &amp; F</i>	Enter the chicken house and join this ladders and levels game. Fall and you'll be scrambled. Avoid disaster and collect all the riches you could want.	9.95
15	•	RICK THE ROADIE <i>Alternative</i>	This may be the closest you ever come to fame and fortune. Your job is to get your group to the gig. If you succeed they will play you a tune. Different.	1.99
16	•	CREEPY CAVE <i>Atlantis</i>	Yes you've done it again – lost your key. But this time it has been found by a ghost which entices you into the caves to retrieve it.	1.99
17	20	OLYMPIC SPECTACULAR <i>Alternative</i>	Gone for another four years, but if you can't wait that long have a go at this version. Pushing on now, but still good value.	1.99
18	•	CRICKET <i>BugByte</i>	Try this if sport is in your blood. Not the most exciting, colourful or stimulating game – but if you are addicted you might like it.	2.99
19	•	COPS 'N' ROBBERS <i>Atlantis</i>	You may consider this of dubious taste, but you must outwit the cumbersome coppers anyway you can to make off with the loot.	1.99
20	•	STAR FIGHT <i>Alternative</i>	Back in the charts is this one from the prolific Alternative. As usual no argument on value for money. Simple and easy to play.	1.99



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**SOFTWARE**  
*Bargains*

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MICRO POWER MAGIC 1 (Stock Car, Felix Evil Weevils, Esc. Moonbase, Swag, Chess, Bandits at 3, Galactic Commander, Adventure, Cybertron Mission, European Knowledge)	C	7.95	5.75
PLAY IT AGAIN SAM (Citadel, Thrust, Strykers Run, Ravenskull)	C	9.95	7.45
PLAY IT AGAIN SAM 2 (Repton 3, Crazy Rider, Galeforce, Codename Droid)	C	9.95	7.45
PLAY IT AGAIN SAM 3 (Commando, Palace of Magic, K. Gorilla, K. Gorilla 2)	C	9.95	7.45
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PLUS 3 GAMES (Planetoid, Firebug, Maze)	D	9.95	4.95
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# Conversion for smoothies

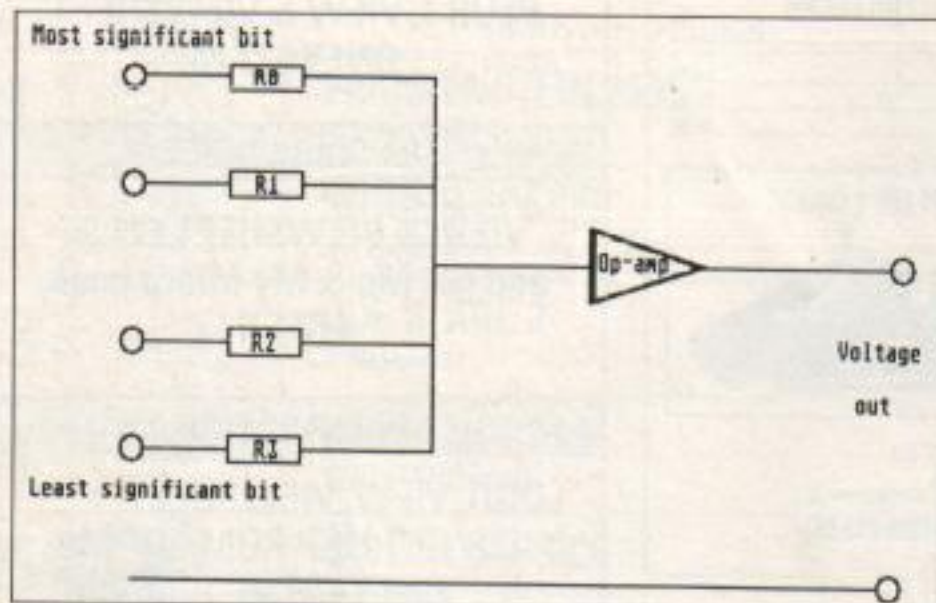


Figure I: A very simple digital to analogue converter circuit

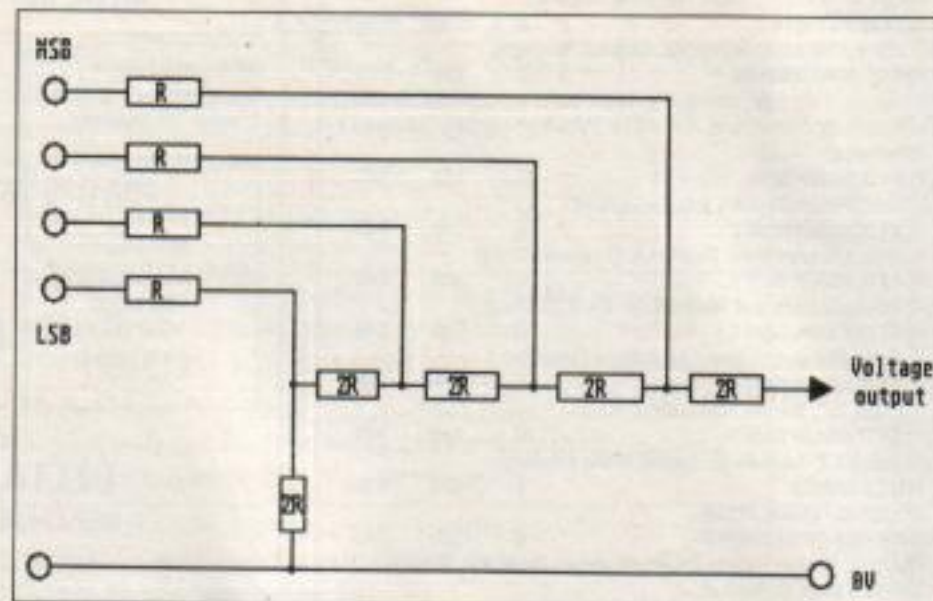


Figure II: An R-2R digital to analogue converter circuit

**W**E completed the construction of our input/output expansion board, in the January 1989 issue of *Electron User*. Now let's look at some of its uses. We're already aware of the task performed by analogue to digital converters – they convert an analogue signal, such as the voltage from a light sensing circuit, into a digital form that can be processed by the Electron. The Plus 1's ADC is a typical example.

However, it is occasionally useful to be able to convert digital information stored in the computer into a varying voltage that can be used to control some external electrical equipment, such as a light bulb or a motor.

The emphasis is on varying, as in the past when we've controlled other items of equipment from the Electron the output voltage has been either 0V or 5V, with nothing in between. This is digital control. Now we'll look at a method of achieving analogue control of equipment in which the voltage changes smoothly from one extreme to the other.

The basis of any system for carrying out digital to analogue conversions is a network

**Using his input/output board, Joe Pritchard shows how to convert the Electron's digital signals into analogue**

of resistors feeding an operational amplifier circuit, such as that shown in Figure I. Digital signals are applied to the inputs, and if the resistors are all the same value the output voltage will depend upon the number of digital one inputs. The more of these there are, the higher the output voltage.

Clearly, the number of different output voltage levels obtained would be the same as the number of digital inputs. A more useful means of getting digital to analogue conversion is to make the value of each resistor different.

In this setup R1 could be twice R0, R2 could be twice R1, and so on. This is a weighted network of resistors, and here the output

voltage depends upon which digital inputs are at one. So the input to R1 has twice the influence on the output voltage as the input to R0. This is, of course, a simple binary system, and if we were to have eight inputs we could have an output voltage with 255 different output levels.

There are problems with using this sort of weighted network, primarily due to the problems of manufacturing resistances that are exactly twice the value of each other. A further resistance network, called the R-2R network, is used in practical digital to analogue converter (DAC) chips. An R-2R circuit is shown in Figure II.

The output voltage produced by this with standard 5V digital inputs will be in the range 0V to 5V. For an eight input DAC – often called an 8 bit DAC – there would be 255 steps between 0V and 5V. However, these steps are fairly small in size, about 20mV per step (5/255).

Changing the least significant bit (LSB) input of a DAC will cause the output to decrease or increase by this step size – called the resolution.

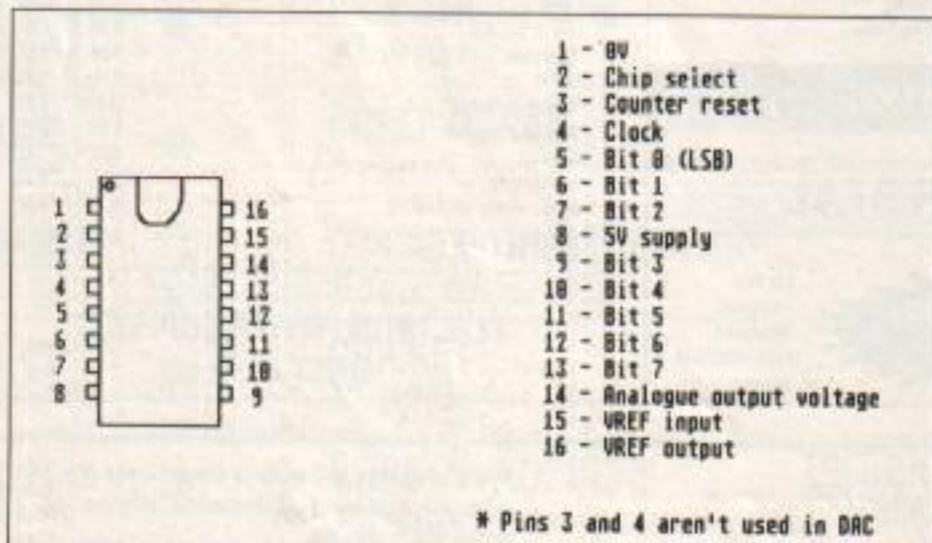


Figure III: The pin-out of the Ferranti ZN425E DAC/ADC chip

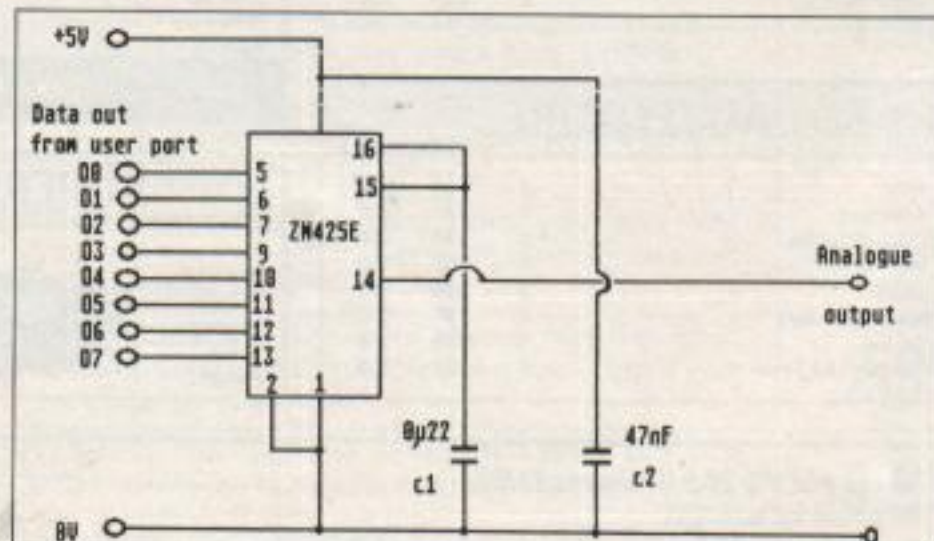


Figure IV: A simple circuit incorporating the ZN425E DAC



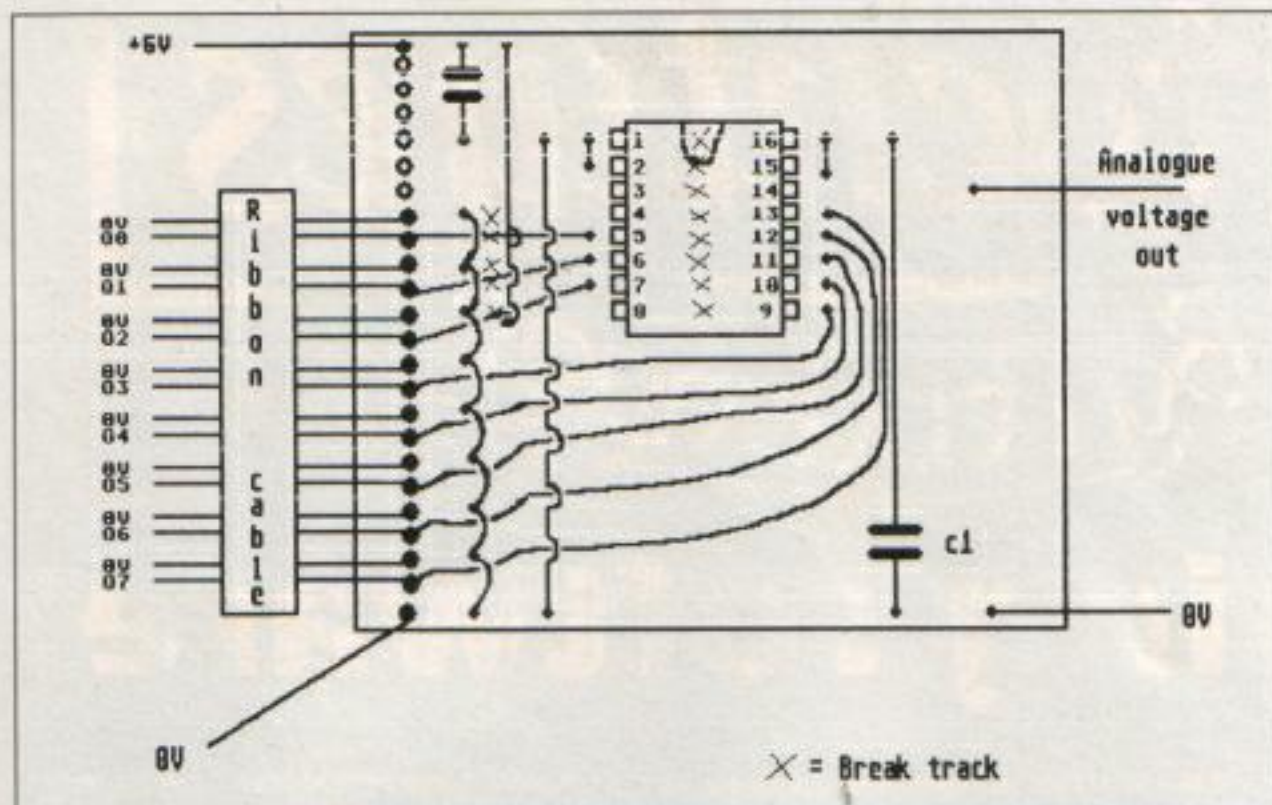


Figure V: One possible use of the digital to analogue converter

In real DAC chips, such as the ZN425E that we'll be using in our circuit, the digital inputs do not feed directly into a resistor, instead they control the action of electronic switches within the chip. These connect the resistor network inputs to either 0V for a zero input, or a separate voltage source called the reference voltage for a one input.

### Increasing output

The output from such a DAC will thus be between zero and the reference voltage, which you can usually select. The output from a DAC can be increased using operational amplifiers to give a larger swing of output voltage where necessary, although this will also amplify the step size.

The DAC we will use is the Ferranti ZN425E DAC/ADC. With a few additional components it can also serve as an ADC, but using the chip as a DAC is simplicity itself. The pin-out is shown in Figure III, and the simplest circuit

that allows the device to be used as a DAC is shown in Figure IV. Figure V shows a possible veroboard layout you could use when building the device.

As to the circuit itself, I decided to use the on-board reference voltage of 2.5V, as this saves us having to produce our own. The problem with a reference voltage is that it should be constant over longish periods of time, because if it varies the DAC output will vary even if the digital input signals remain the same.

The capacitor connected to pin 15 is to prevent glitches from giving momentary spurious output voltages. The maximum reference voltage the chip can take on pin 15 is 3V, so don't try using the 5V supply from the user port as a reference voltage.

The capacitor between 5V and 0V is just to decouple the supply, and we take the chip select line of the DAC – pin two – to 0V to permanently enable the output so it constantly reflects the digital input signals it receives from the user port.

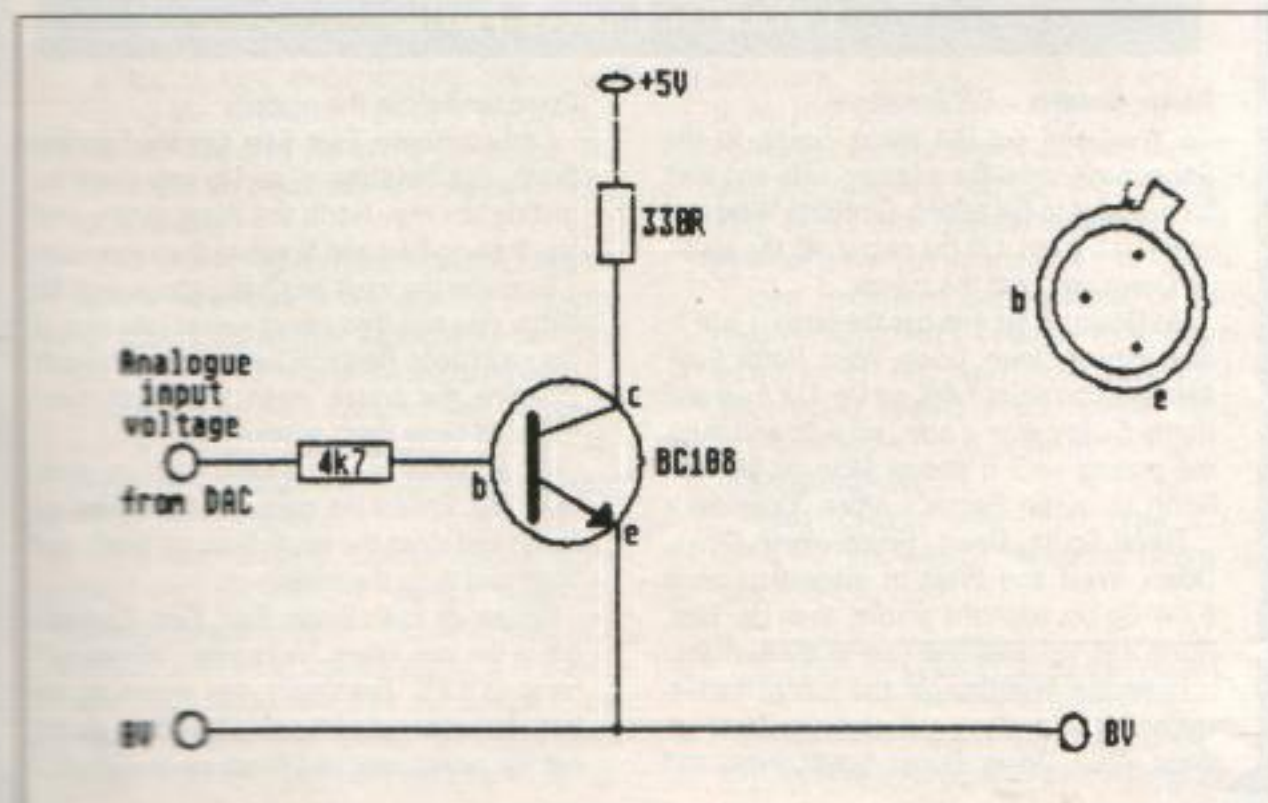


Figure VI: Testing the digital to analogue converter

### Building the circuit

There's nothing complicated about building the circuit. I used a socket for the chip to protect it from damage while soldering. In addition, with the more complex chips like this one it's not a good idea to handle it too much, as it's just possible that static electricity could damage the internals.

Solder the capacitors as closely to the socket pins as possible, and don't forget to break the tracks on the veroboard between the pins on the socket.

You may wonder why I've connected the wires on the ribbon cable between those carrying signals from the user port to ground. It prevents a phenomenon called crosstalk in which a wire carrying a zero signal adjacent to a wire carrying a one can have a momentary signal induced in it which can cause it to act as if it, too, was carrying a one.

This would lead to random fluctuations in output voltage whenever the input signals changed their values. Not very desirable. Separating the signal inputs from each other by ground connections minimises this effect.

You will need either a voltmeter capable of reading 0V to 5V or a simple circuit such as that shown in Figure VI to test the circuit. With the power disconnected, plug in the ZN425 chip, taking care not to bend pins and to get the chip in the socket the right way up.

Now plug the ribbon cable into the user port and turn the Electron on. If the usual sign on message doesn't appear, turn off immediately and re-check the DAC circuit, especially around the input lines for short circuits.

Now connect up the circuit in Figure VI and use a program such as the following to write bytes to the user port:

```
1000 FOR I=0 TO 255
1010 ?port_address=I
1020 TIME=0
1030 REPEAT UNTIL TIME>50
1040 NEXT
1050 FOR I=255 TO 0 STEP -1
1060 ?port_address=I
1070 TIME=0
1080 REPEAT UNTIL TIME>50
1090 NEXT
1100 GOTO 1000
```

If the port is VIA-based don't forget to set up the data direction register before running this program. You should see the voltage on the meter gradually increase and decrease or the brightness of the LED change as the program runs. If not, check the connections of the DAC to the reference voltage and output pin.

● You should now have a working DAC. Next month we'll examine the use of the DAC to generate sounds, and how it can be the basis of a sound effects circuit.



# Adventures

By Pendragon

## Blooming software

**T**HE snow has melted and the first mad hares are playing in the field. I sit here feeding my pet falcon Epico, while poring over the dozens of scrolls which have arrived at the castle since I last held forth to you.

A new adventure software house has emerged for the Electron, trading under the bubbling name of Sodasoft. It is set to release a series of 120 location games centred on the adventures of bounty hunter Jim Band.

Each will be released on tape, back to back with a 64k version of the same game. With the ever increasing 64k Electron user base this seems to me to be an idea that other software houses should have thought of eons ago.

The adventures are designed as spoofs on the James Bond/Rick Hanson genre of spy stories. I look forward to receiving its first offering for review within the next couple of weeks.

Another impending release is a Tolkienesque adventure called *The Seekers* from Andrew Harkness – remember I was very impressed by his entry to our home-penned adventure competition in 1987.

His new game includes a novel spellbinding facility which owes something to Level 9's superb *The Price of Magik*. Once again I look forward to reviewing the adventure in the very near future.

Tricia Revest writes to ask for advice on beginning to write her own adventure. Judging by her letter, she already possesses a lovely writing style which is half the battle.

Like many, she can only devote her spare time in the evenings, and wishes particularly to know which is the best adventure creation tool available for the Electron.

You have basically a choice of four: Incentive's *Adventure Creator*, Alpine's rom-based *ALPS*, Phoenix Software's *Adventurescape* and Gilsoft's *The Quill*. While *ALPS* is an excellent utility, its rom dependence means you will need a Plus 1 or Rombox fitted to your Electron in order to use it.

All of Heyley's 250 location games are written using a modification of *Adventurescape*, perhaps proving the power of this generator. However, it is rather a complex program and may cause unnecessary confusion to novices.

*Adventure Creator* was used by Incentive to create *The Ket Trilogy* and *Winter Wonderland*,

but as a tool is perhaps more ideally suited in its BBC Micro format for graphic adventures.

That leaves *The Quill*, which has been used successfully by Geoff Larsen, Anthony Lee, Larry Horsfield and others.

It is by far the most popular of the adventure generators for the Electron and is also my first choice. It can now be picked up from some mail order companies for as little as £12.95, so it also represents a real bargain.

I would be delighted at anytime to receive

readers' home-penned adventures for review or evaluation. So if you think your creation is worthy of publication, grab a carrier pigeon and send it this way.

This month's map is of the opening scenario in Larsoft's *The Nine Dancers*, which I hope will help many frustrated adventurers. Next month I continue this series of maps with a guide to the openings to part one of *The Ket Trilogy*.

● *That's it for this month, so until puppet strings need variables, happy adventuring.*



### Knights of the Round Table



This section is dedicated to experienced adventurers who offer their help and expertise to intrepid travellers who are stuck at various points in different adventures. Don't forget that if you write to one of my knights for help, please enclose a stamped self-addressed envelope.

Kneel and arise: Dame Emma Rutherford of 141 Bargates, Leominster, Herefordshire, who can offer help with *Voodoo Castle*, *Sphinx Adventure*, *Kingdom of Hamil*, *Staff of Law*, *Myorem*, *Hampstead*, *Terrormolinos*, *Woodbury End*, *Enthar Seven*, *Quest for the Holy Grail* and *Lords of Time*.

### Readers Hall of Fame

#### *Dodgy Geezers – Bill Zanzinger*

Go West and cut the fence. South to the Dobermans, drop the sleeping pills and wait for the dogs to fall asleep. Go North West and examine the hut. Lift the carpet, lift the cover, go Down and light the match.

Go Down, West and get the lamp. Light it, then journey Down, Down, West, North, East. At inspection point 7-4-6, go Up, Up, East and North. Soapy digs a hole, so wait and push the grating until it opens. Now go Up and North to Justin Perrier's office. Examine it. Travel South, Down, South, West, Down, Down, West and West to inspection point 6-7-4. Go Up, open the grating, then Up, East, North, Up, Up, East and East to the skylight.

Open the skylight, get the diary, read it, replace it and close the skylight. Now go West, West, Down, Down, South, West and

Down, and close the grating.

Carry on Down, East, East, Up, Up, East and North, get the pickaxe, go Up and close the grating. Journey North and West, get the trolley, then go East and South to the vault door.

Examine the vault and hang about until Mr Video asks you if you want him to take care of the vault door. Reply YES and enter the vault. Examine the crates, open them and don't forget to close them afterwards.

When asked if you should load up now, reply NO. Collect the nails, get the trolley, go North and close the vault. Now go North and West and drop the trolley.

Follow on East, South, East, East, East and get in the van. When Tricks asks "Where to?" reply DOCKS. Eventually you arrive at the jetty. Now get out of the van, board the yacht, get the newspaper and finish by reading it.





## Adventurer's Glossary

- Table:** Try standing on it.  
**Talisman:** Magical artifact that when worn may protect you against evil spirits. Try waving it.  
**Teardrop:** A valuable treasure.  
**Tiara:** A treasure which can be worn with startling results.  
**Thief:** Like the pirate he is best avoided if you are carrying valuable treasure.  
**Tiger tooth:** You need to extract it from the tiger first! May have a use as a tool.  
**Topaz:** Definitely a treasure.  
**Torch:** Save it for use in dark places, but ensure that you can light it.  
**Towers:** Nearly always need climbing and exploring. Look for a maiden in distress.  
**Trap door:** Usually only opens from one side, so take care that you don't get trapped.  
**Treasure:** It needs collecting and storing.  
**Tree:** Climb it to see more of your surroundings.  
**Trident:** When dropped it can draw water from the earth. Can also be used to fend off nasty creatures.  
**Troll:** Nearly always unfriendly, so try killing it or avoiding it entirely.  
**Tunnels:** They usually twist and turn, so map them carefully.  
**Tusk:** It's ivory, so therefore a treasure.

## Problems Solved

Craig Campbell asks how to open the man-hole in **Project Thesius**. It is a simple matter of loosening the securing bolt with a spanner, Craig. In the same game Hugo Burchall asks where he can find the overalls. You will find them in the chest in the cave on the beach. The chest must be examined and you should press 640.

Craig is also experiencing difficulties finding the bucket in Larsoft's **Wychwood**. You will find it in the loft in the house. The bucket should then be filled at the pond in the country lane.

Five years after its launch on the Electron, **Sphinx Adventure** is still creating problems for readers. Karen from Basingstoke can't find the mouse which she will need to frighten the elephant. The little creature will be found scurrying around the dungeon of the vampire's castle. Tempt it with a morsel of cheese if you wish to catch it.

At a later stage P. Coates can't find the elephant. Go to the palace near the catacombs and drop the mouse in front of it. He also asks what use the rug is. It is a valuable treasure, so take it to the Sphinx in the desert. He also says that he has used **Diaxos** to open the safe but can't get into it. Go up.

**Diaxos** will help you get back anything the troll takes, as he keeps it in a **SAFE** place.

Dermaid Collins wants to know how to get across the glacier. As long as you have got the ring you can use the wand.

To help many readers who have inquired about my bottle fix in the game, it works thuswise: When you get the "You can't carry any more" message, rub the ring and fill the bottle with water from the lake. Return to the object you wanted to pick up, drop the water, and you now find you can take the object. This works any number of times, and in essence gives you an unlimited inventory.

John Hefferman has explained a simple cheat in Acornsoft's **Countdown to Doom** - beware, as this will not work in the Topologika update of the game. To get unlimited moves plug in the game's rom cartridge and switch on.

Press Escape and then type **LOAD "DOOM2"** and when it has loaded list line 205 and alter it to read:

205: IF FNRS(78)>0 PROCM(286)

Trevor Davies wants to know if there is a way past the giant squid in Epic's **Kingdom of**

**Klein**. No, there is no need to even attempt it, Trevor. Martin Stubbs can't get across the lake. Go to the chapel, push the portrait and unlock the safe.

In **The Incredible Hulk** H. Carroll needs to know how to get the bio gem without the natter egg exploding. Try eating the egg.

Some tips to help George Jackson and others: In **Hampstead** the Sony Walkman is irrelevant, so try reading a magazine instead. The filing cabinet must be prised open using the screwdriver which you earlier pinched from the furniture department.

To finish the game, return to the Oxfam shop, change back into your old tracksuit, pick up the bike and walk into Hampstead with Pippa.

Henry Porter wants to know how to get the last treasure in Micropower's **Adventure**. Go to the scrubland past the dragon, drop one of your treasures and steal it back. Simple really huh?

Finally, Clyde King wishes to know where the keys are in **Adventureland**. Have you been up the tree, Clyde? And to get the golden fish you must use the bottle, but ensure that you have the golden net with you.

More problems solved next month.



Don't miss out on the mass of material that's appeared in *Electron User* over the past few months. Bring yourself up to date with these back issue bundles. Each one is packed with games, utilities, features and programming tutorials.

***Here's what you'll find in the July-October 1988 bundle:***

**July 1988 issue:**

*Games:* Knockout Whist, Randall Rabbit, Tilley the Train, Tennis. *Utilities:* Shadow ram filing system, machine code score routines, Easy Reader. *Reviews:* Advanced Plus, Spycat. *Features:* Machine code tutorial, adventures, Memory Map part 3.

**August 1988 issue:**

*Games:* Fox and Geese, Solitaire. *Utilities:* Mini Prolog, disassembler. *Reviews:* E00 ADFS, Repton Thru Time, Barbarian, Romplus-144. *Features:* Machine code tutorial, adventures, Memory Map part 4.

**September 1988 issue:**

*Games:* Fire!, Bulls and Cows, Crypton, Oxo. *Utilities:* Sprite routines, Listif. *Reviews:* Anarchy Zone, Stranded, Round Ones, Times Computer Crosswords, Advanced User Guide. *Features:* Basic rom routines revealed, adventure tips.

**October 1988 issue:**

*Games:* Pistol Shooting, Spencer Spider, Gobbler. *Utilities:* Scroller, Rom Manager. *Features:* Rom routines revealed, adventure tips, Plus 1 hardware project. *Reviews:* Music 5000, Shark, Breakthrough, Plane Crash, Golf, Darts, Control Applications of Micros.

***November 1988-February 1989 bundle:***

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Opening gambit map number 2

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In dried  
pond

Examine  
pamphlet  
Read  
Envelope  
Pamphlet

Antiques  
Shop

Inside  
Antiques  
Shop



Path

Policeman



Dig  
Um

Field

Haystack (needle)  
search

Field

Field

Examine  
Scarecrow  
(coat)  
Tent peg  
Dig

Break Um  
Alarm

General  
Store

Village  
Green

Bus  
shelter

Button  
Litter bin  
Examine bin



Tea Shop

Inside  
Tea Shop

Tables (Newspaper) Counter (loaf) Examine table and counter  
Take loaf Take newspaper



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Inn

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Village  
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See Electron User JAN 1989 for review of PEGASUS

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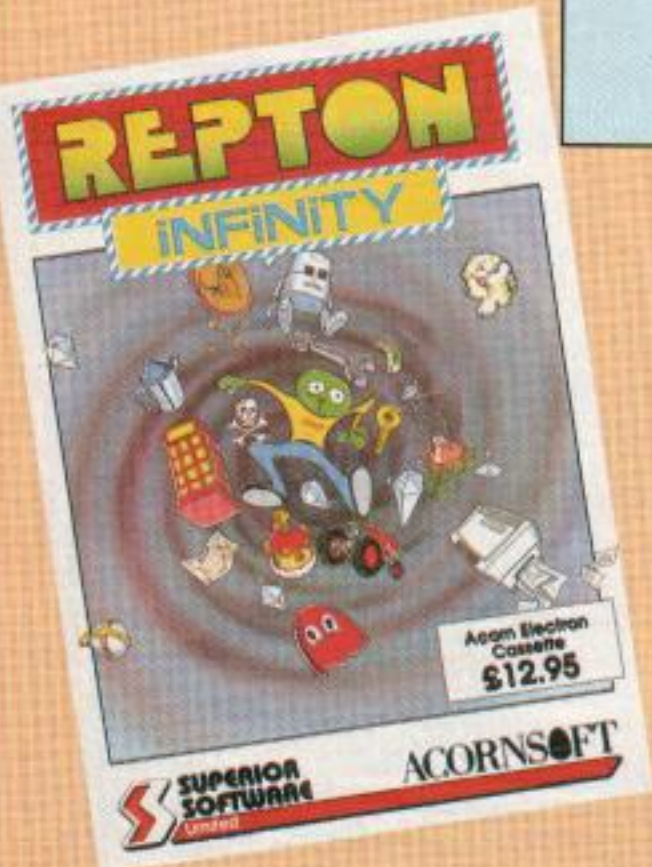
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# SUMMARY

## The ultimate Repton?



IF you thought you'd seen every possible variation of that classic game, Repton, and that the theme had been done to death, hang on to your boots, as Repton Infinity – from Superior, of course – will blow your socks off. This latest incarnation of that lovable green skinned reptile has got to be the best yet.

There are four different games – and I don't mean four sets of screens for Repton 3 – and four utilities to enable you to write your own games. In the first game, **Repton 3 – Take 2**, you amass as many points as possible by collecting crowns and diamonds and disposing of the odd monster or two.

The usual gigantic eggs are scattered about ready to hatch into irksome monsters. Less difficult to shake off are large spirits which float about and can be trapped in cages which then turn into diamonds. Teleporters abound, but they can whisk you off into dead ends or traps if you're not careful.

**Repton 4** is the second game and here your task is to grab banknotes conveniently left lying around among piles of jewels. Try to kill the ghouls that hatch out of the eggs, but watch out for the fungus that spreads like wildfire.

Magiblocks are special boulders that can be pushed up, down, left or right and when you get three in a row they turn into diamonds which can be collected for a bonus. Transporters are present as usual, and photocopyers are an additional feature. They can copy almost anything, but only work once.

Repton 4 is similar to Repton 3 with slight variations. The new features add a few puzzles and keep up the interest.

The third game is **Robbo**, and this departs even further from the traditional Repton gameplay. There are many similarities, but also quite a few differences. You control a small robot, and to test his intelligence he has been placed in a time-space puzzle vortex.

You have to collect the flashing orbs and solve a number of puzzles, like repairing a computer, lighting a bulb, putting a can into a

Product: *Repton Infinity*  
Price: £12.95  
Supplier: Superior Software, Regent House,  
Skinner Lane, Leeds. LS7 1AX.  
Tel: 0532 459453

fridge, mowing some grass and one or two more.

The last game, **Trakker** is probably the strangest of the four. You are the driver of a Jaffa – the Jagga Annihilation and Fruit Flinging Associates – and your mission is to dispose of all the hideous Jaggas and other nasties.

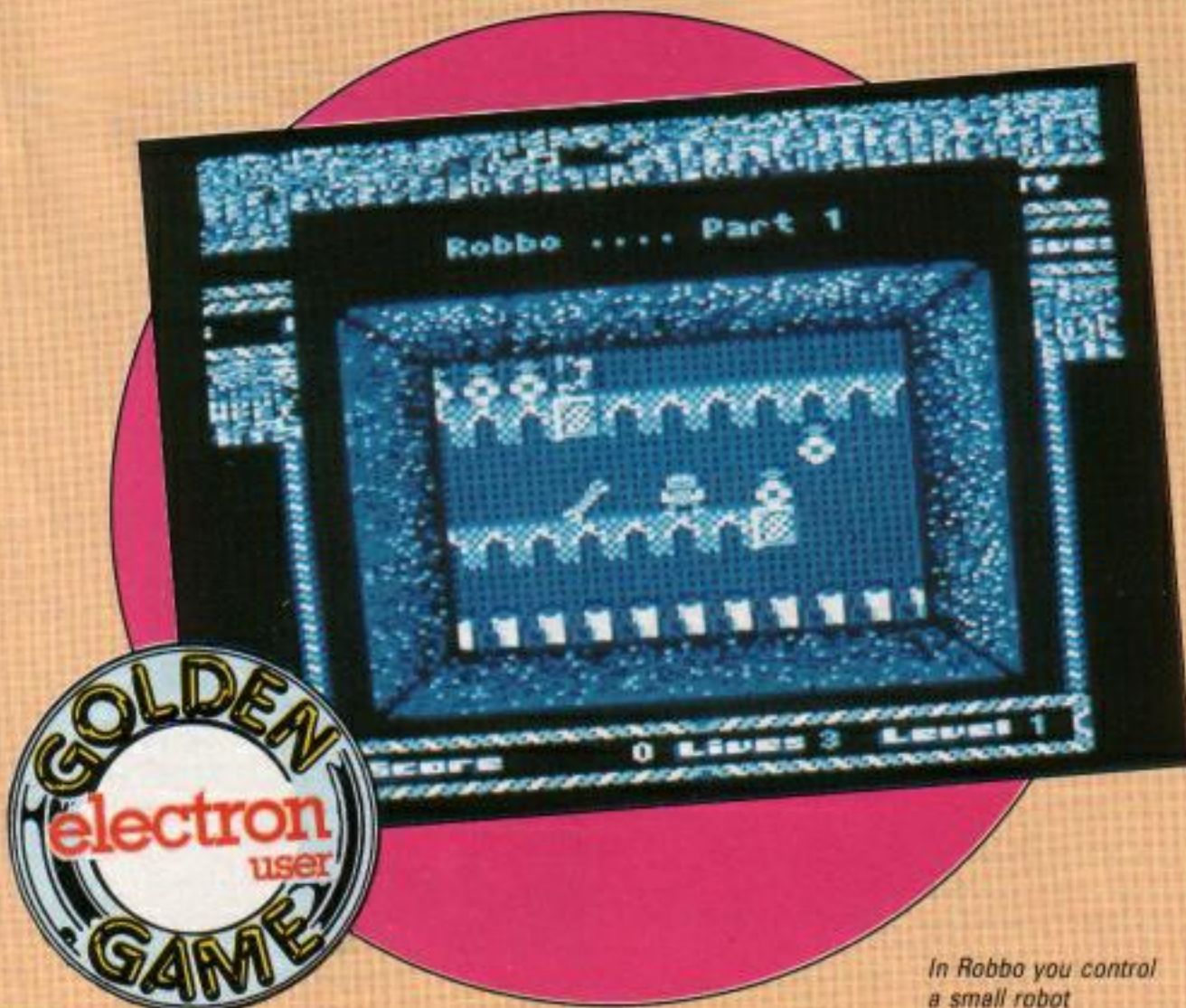
You are equipped with a bulldozer (a JCB GT?), sticks of dynamite, detonators and Killfruit. To use the dynamite you guide Kevin, your pal, to the dynamite, then run over a detonator. Jaggas can be squashed with tomatoes, but only from behind. And bananas

turn them into tubular spiders – all very strange, but fun.

Once you've mastered these four games you can get to grips with the Repton Infinity game creator itself. Four utilities are involved in the making of a game, the first being Film Strip, a sprite editor. Here you can modify an existing character or start from scratch and design a new one.

Once the characters have been formed you write a Basic-like program using a special editor and compiler. The purpose-designed language is called Reptol and is fairly straightforward, though like any programming language you'll need to put a fair bit of effort into learning it to get the most from it.

The 71 page manual provides descriptions of all the commands, plus a beginner's tutorial section. The commands include CHANGE to change one character into another, IF ... ELSE ... ENDIF and GOTO are like



In Robbo you control a small robot



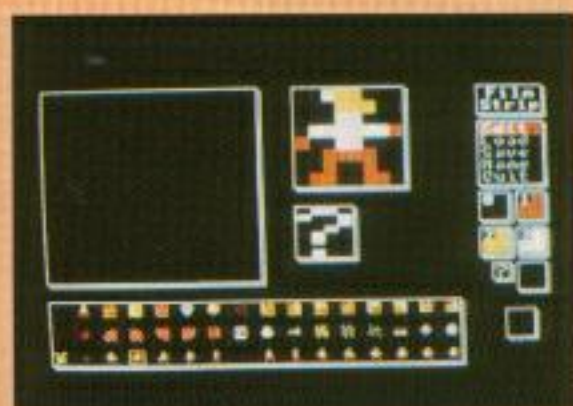


## You may confer

their Basic counterparts, KEY tests the Return key, SCORE increments your score, MOVE moves a character and so on.

Once the program logic has been created it's on to the Landscape Designer. This is where you design the maps that are used to create the landscape through which you move. The utility is quite simple and just involves picking up various characters and plonking them on the map. Skill is required in designing puzzles and traps, so be prepared for a little head scratching.

The final task to be done is to link all the files created – sprite, landscape and program logic – into one runnable program, and this is performed by the fourth utility File Link. This enables you to specify the filenames of the various parts so they can all be loaded in the right sequence.



The character designer

Repton Infinity is definitely the ultimate in this popular series. Not only are the four games superb – and all different from the standard Repton format – but the game creator is a stroke of genius.

I must admit to being a little bewildered by the number and variety of functions and options, and I have yet to create a full game. It'll take a fair bit of hard work, but not half as hard as writing the whole thing from scratch. Repton Infinity is an absolute must.

**Roland Waddilove**

Sound .....	9
Graphics .....	10
Playability .....	10
Value for money .....	10
Overall .....	10

## Second Opinion

*Wow! This is the best yet from Superior. The biggest case, the thickest manual, four great games with two sets of screens each and an amazing program creator that enables you to write your own Repton games in Reptol – a new arcade games writing language. At only £12.95 this has got to be amazing value for money. Well done Superior.*

**Janice Murray**

QUESTION of Sport fans, and no doubt there are quite a few, can now have a bash at this popular quiz game in their own homes, courtesy of Elite, Superior and Acornsoft – it's a crowded loading screen with all those logos.

You are soon greeted by the familiar smiling faces of David Coleman, Bill Beaumont and Ian Botham, and you can choose to be either Bill or Ian. Other options include a one or two player game and a choice of 25 question files. You can choose your specialist subject and two team mates from a board of well-drawn faces.

As in the television game, there are six rounds: Picture Board, Mystery Personality, Home or Away, What Happened Next, Quickfire and then back to the Picture Board to finish off.

I expected the Picture Board to be similar to the television, however, this would be asking too much of the Electron's graphics. Instead each square flips over to reveal an icon representing a sport.

A speech bubble appears over David Coleman's head and the question scrolls rapidly right to left. Four answers are displayed multiple-choice fashion and you must choose the right one within a time limit. If you don't, or you get it wrong, the question is passed over to the opposition.

The Mystery Personality round is the same in name only. You are given three clues, one at a time, as to a person's identity. Three points are awarded if you get it at the first clue, two at the second and one at the third.

The third round tests your specialist knowledge, or you can choose to play away and answer on a foreign subject. The fourth round is What Happened Next? Here an incident is described and you have to supply the answer.

The penultimate round is Quickfire Questions – everyone with their fingers on the buttons and the first to answer correctly gets

Product: Question of Sport

Price: £12.95

Supplier: Superior Software, Regent House, Skinner Lane, Leeds LS7 1AX.

Tel: 0532 459453

the points. Finally it's back to the Picture Board to finish off the remaining squares.

The graphics are pretty good, with recognisable faces and well chosen icons, but there isn't much sound to speak of. If you like general knowledge, sport and trivia games you'll probably like this too. It's a fun game for all the family.

**Jo Giles**

Sound .....	3
Graphics .....	8
Playability .....	8
Value for money .....	7
Overall .....	8

## Second Opinion

*Question of Sport is a fairly good attempt at reproducing the excitement and fun of a TV quiz program. However, the game won't appeal to everyone, and there is a limited supply of questions, though it should take you quite some time to work your way through 25 files.*

**Janice Murray**







The screen begins scrolling from right to left bringing a steady stream of alien creatures

DURING the next few months Impact is planning to release a number of top quality games at reduced prices, though not quite budget level. The first is Zenon, a one or two player arcade style action game with 250 levels.

Reading the packaging sleeve I soon discovered the game has no real plot. All you are told is that you have to penetrate all 250 levels of the game, a feat I am sure will require an extraordinary amount of stamina and concentration. Little wonder that the company has claimed it has yet to be achieved.

You are beamed down to the surface of the planet Zenon armed with a laser pistol and jetpack and the screen begins scrolling from right to left bringing a steady stream of alien creatures, missiles and other objects directly toward you.

You must either destroy them with your laser or avoid them by flying over or ducking under. Contact with any alien drains your energy. Fortunately, for the first few seconds after arriving on the surface you are immune to the hostiles' damaging effects. This gives

Program: Zenon  
Price: £4.95 (tape)  
Supplier: Impact Software, Neepsend House,  
1 Percy Street, Sheffield S3 8AU.  
Tel: 0742 769950

you time to make yourself comfortable and find the keys you need to play the game.

The two player option allows you and a friend to battle against the creatures simultaneously. Luckily, your weapons don't harm each other, and I found that you tend to stay alive a lot longer with a friend to back you up.

As always, the activity around the keyboard during a two player game can be quite frenetic, but, being a veteran at playing Dunjunz with four players hitting keys at the same time, playing with just one other player is a piece of cake.

You lose a life once your energy is depleted and losing four lives signals the end of the game. You will occasionally encounter a

weapon cannister which, if it touches you, exchanges your current weapon with one contained in it. This can sometimes increase your damage-causing capability, but it can work the other way too.

It is possible to restore lost energy by either avoiding damage – thus allowing your spacesuit to recharge slowly – or by collecting energy cells which occasionally float by. To complete a level you must negotiate a distance of about 10 screen widths. This allows you to progress to the next, which is slightly more difficult and contains new creatures to zap.

Zenon has all the usual sounds associated with this type of game, but if you like a bit of peace and quiet you can turn them off. There is a high score table and a pause facility – nice to see them in such a reasonably priced piece of software.

Verdict? I found the game a bit too repetitive after a while. It failed to hold my attention for very long and I soon began to lose interest in running – or flying along – zapping the steady stream of creatures barring my path to the next level.

The designers must have spent a great deal of time on the sprites for the many different levels. There are aliens, androids, fireballs and missiles, but I'll probably never play this long enough to meet half of them.

If Impact can produce more games at the same price with the same excellent quality graphics as Zenon, but with more to them than just zapping aliens, the result might be nice little earners.

Desmond

Sound .....	7
Graphics .....	9
Playability .....	6
Value for money .....	8
Overall .....	8

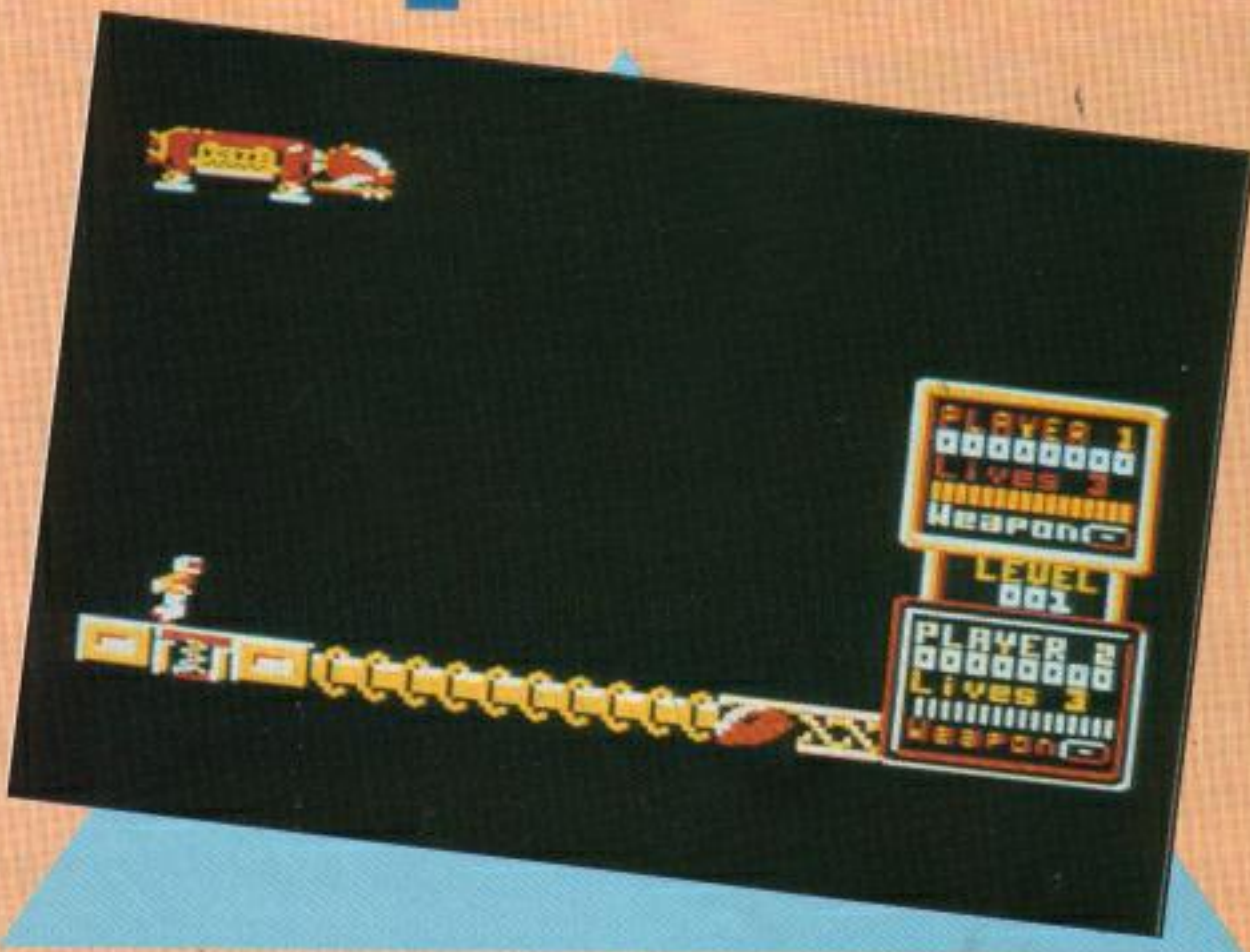
## Second Opinion

I QUITE enjoyed this mindless zap 'em arcade game. Don your spacesuit, pick up your trusty laser and go for a scroll on the moon blasting all and sundry to kingdom come.

The only bad points are that it does become a bit repetitive, and it's very similar to Rampage. There are a number of differences, but basically the idea is the same. Definitely worth a look.

Janice Murray

# Zap-'em!



You are beamed down to the surface of the planet Zenon armed with a laser pistol



If you want to start doing more with your micro than just playing games, this package is your ideal introduction to the four most popular applications for professional computers. All the programs have been designed for simplicity, so even a child can use them. Yet they include advanced features not yet available on programs costing many times as much!

**Finalist for the Home Software  
of the Year Award**



**Contains 32 page booklet giving clear,  
easy-to-follow instructions on all 4 programs**

**Word Processor:** Ideal for writing letters and reports. There is a constant display of both time and word count, plus a words-per-minute display to encourage the budding typist! A unique feature is the double-size text option in both edit and printer mode — perfect for young children and people with poor vision.

**Database:** You use this for storing information, just like an office filing cabinet. Facts you have entered can be quickly retrieved by just keying in a word or part of a word. They can be sorted, replaced, saved for future use or printed out.

**Spreadsheet:** Enables you to use your micro for home accounts or pocket money records. It creates a display of numbers in rows and columns. Continuous updating is possible, and a changed figure can be instantly reflected throughout the rest of the spreadsheet. Your results can be saved, to be used for future updates, or can be fed into its associated program . .

**Graphics:** Part of the spreadsheet section, it lets you draw bar charts, pie charts and histograms to give a graphic presentation of your statistics. Helps to give life and colour to the duller figures!

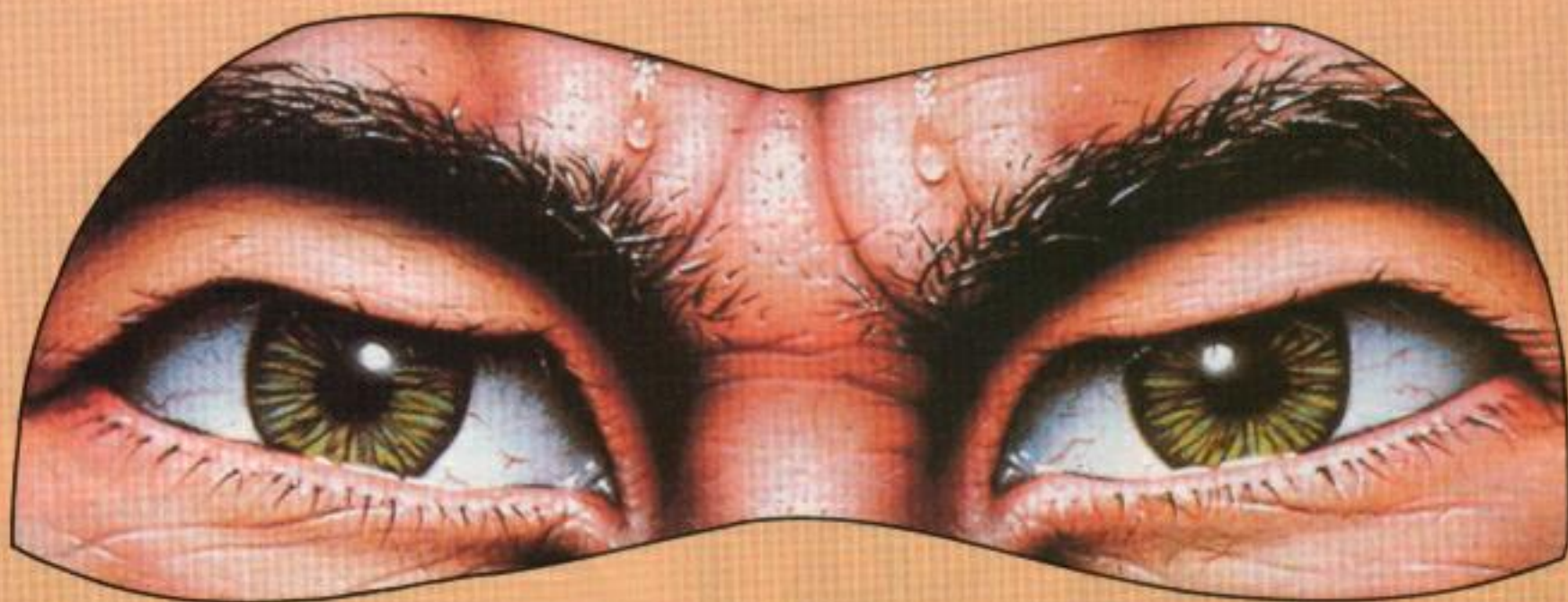
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## Cut above the average

THE Last Ninja is a story of jealousy, power, and revenge – of good versus evil and one man's struggle against overwhelming odds. Oh yes, I almost forgot, it is easily the best martial arts-cum-adventure game on the market.

For many years the evil Shogun had envied the closely guarded skills and secrets of the Ninja. Executing a dastardly plot he slaughtered the Ninja community on its once-a-decade visit to the sacred island of Lin Fen.

Unbeknown to the Shogun a solitary Ninja – Armakuni – had been left behind to guard the shrine, feed the cat and perform other such tasks. Now he has sworn to avenge the deaths of his comrades and re-build the Ninja empire.

You play Armakuni as he begins his assault on the island of Lin Fen. There are sixteen separate locations on the island and you must kill every guard and collect all available objects on each level before advancing to the next.

Control is achieved using the keyboard only – this may sound restrictive for a martial arts game, but it works well in practice. In addition to the direction keys there are also three separate jump buttons – each providing increasing distance. As if to demonstrate his supreme athleticism, Armakuni insists upon performing a forward somersault when prompted to jump.

Level one is set in the wilderness, a barren wasteland of rocks, bushes and thoughtfully provided paths for you to walk on, but it is patrolled by the Shogun's warriors. Inexperienced in the way of the Ninja, they do not yet possess your skills, but they are still capable of giving you a good thumping if you become careless.

Initially unarmed, you must pummel your opponents using only fists and feet. Things become a little easier as you round the first corner and find an abandoned sword – the first of five weapons available on level one. By pressing the spacebar you can quickly switch between any of the weapons currently in your possession. The instructions advise you to use the same weapon as your oppo-

Product: *The Last Ninja*  
Price: £9.95 (tape)  
Supplier: Superior Software, Regent House,  
Skinner Lane, Leeds LS7 1AX.  
Tel: 0532 459453

nent, but I found the sword to be effective against most adversaries.

Unlike many games, you are not restricted to travelling in one direction, but are free to wander where you wish within the confines of the location. Another very welcome feature is the way that the guards stay dead once you have dealt with them – there is nothing worse than returning to a location and having to fight the same guard that you killed five minutes earlier.

Once you have mastered the human opponents, why not try your hand with the flaming dragon that guards the exit to level two?

The last Ninja is quite a departure from programmer Peter Scott's traditional style – the prolific author of countless cute platform

games has really come up with the goods this time. Ninja is fast, furious and totally addictive.

Jon Revis

Sound .....	7
Graphics .....	8
Playability .....	9
Value for money .....	9
Overall .....	9

### Second Opinion

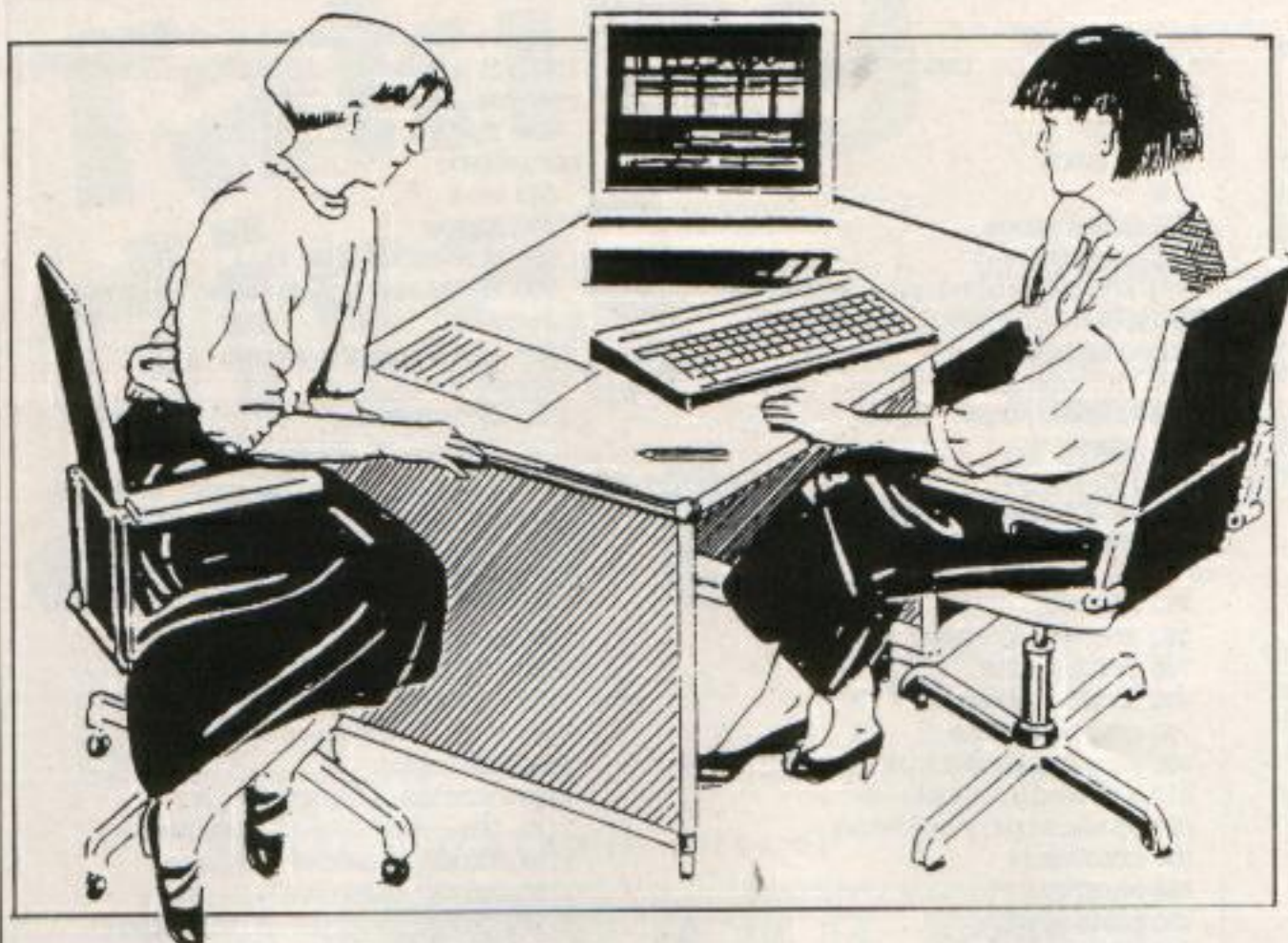
FROM the title and packaging I expected this to be just another ordinary martial arts beat-'em-up game. However, although it does have a fair proportion of combat, there is also an adventure element in that you have to explore your surroundings and discover weapons to take on the enemies. I like it, and can thoroughly recommend it.

Janice Murray



Putting the boot in





**Find out – grab a friend and try out Jim Proctor's brain straining board game**

**T**AKTIKS is an interesting board game for two players which is loosely based on that classic game Nim. This involves picking up matchsticks from the table, and the one who takes the last one is the loser.

In this computerised variation counters are placed in a four by four square. You take turns to go and you can pick up one, two, three or four adjacent counters, but they must be either in a vertical or horizontal line. Taking diagonals or counters which aren't next to each other is illegal. The object is to leave one remaining counter for your opponent. He picks up the last one and has therefore lost the game.

The screen shows a calculator-style display with the scores in the top left and right hand corners. All the counters are labelled with a letter and you'll be prompted to input the ones you want to remove when it is your turn.

Enter up to four letters – they must be in alphabetical order – and press the Return key. Remember that the counters must be next to each other, otherwise the program will beep annoyingly at you and prompt you to enter your choice again.

You take turns to start, the one going first having a slight advantage. Tactics and strategy, plus an ability to think ahead are required in order to succeed. Have you got what it takes to become an expert? Grab a partner and see.

# NIMble witted?

**SCORE:**  
(A) 0

**SCORE:**  
(B) 0

A	B	C	D
E	F	G	H
I	J	K	L
M	N	O	P

**Player(B) TO GO**

Remove up to 4 adjacent letters  
from only one row or one column  
**LEAVE just ONE letter to WIN!!!**  
**SELECT your letters now....**

```

10 REM Taktiks
20 REM By Jim Proctor
30 A:=0:B:=0
40 DIM plak$(15),row$(4),col$(4),pi
   c$(4),asc$(4)
50 REPEAT
60 MODEL
70 PROCinit:PROCscrn
80 REPEAT:PROCmove
90 UNTILcount%<2
100 PROCend
110 UNTIL FALSE
120 END
130 :
140 DEFPROCinit
150 VDU23,240,0,0,0,255,255,0,0,0
160 VDU23,241,24,24,24,24,24,24,24,2
   4
170 VDU23,242,0,0,0,7,15,28,24,24
180 VDU23,243,0,0,0,224,240,56,24,24
190 VDU23,244,24,24,28,15,7,0,0,0
200 VDU23,245,24,24,56,240,224,0,0,0
210 top$=CHR$242+CHR$240+CHR$243
220 bot$=CHR$244+CHR$240+CHR$245
230 lnk$=CHR$8+CHR$8+CHR$8+CHR$10
240 blank$=top$+lnk$+CHR$241+CHR$32+
   CHR$241+lnk$+bot$
250 RESTORE
260 FORI%=1TO4
270 READrow$(I%),col$(I%):NEXT
280 ENVELOPE1,1,0,0,0,0,0,126,-1,-
   1,-1,126,0
290 VDU19,1,2;0;19,3,5;0;
300 ENDPROC
  
```

Turn to Page 22 ►



# ◀ From Page 21

```

310 DATA ABCD, EFGH, IJKL, MNOP
320 DATA AEIM, BFJN, CGKO, DHLP
330 :
340 DEFPROCscrn
350 count%=16:turn%=2*RND(2)-3
360 VDU17,3,17,129
370 PRINTTAB(11,1)SPC17TAB(11,2)" T
A K T I K S "TAB(11,3)SPC17
380 VDU17,2,17,128
390 VDU5:GCOLOR,2
400 MOVE11*32-4,1023-28
410 DRAW28*32,1023-28
420 DRAW28*32,1023-32*24
430 DRAW11*32-4,1023-32*24
440 DRAW11*32-4,1023-28
450 MOVE11*32-4,1023-4*32
460 DRAW28*32,1023-4*32
470 MOVE11*32-4,1023-32*21
480 DRAW28*32,1023-32*21
490 VDU4
500 FORI%=0TO15
510 x%=I%MOD4:y%=I%DIV4
520 plak$(I%)=top$+lnk$+CHR$241+CHR$
(65+I%)+CHR$241+lnk$+bot$
530 PRINTTAB(4*x%+12,4*y%+5)plak$(I%
)
540 NEXT
550 COLOUR1
560 PRINTTAB(4,1)"SCORE:"TAB(4,3)"(A
):A$
570 COLOUR3
580 PRINTTAB(30,1)"SCORE:"TAB(30,3)"
(B):B$
590 COLOUR2
600 PRINTTAB(4,25)"Remove up to 4 ad
jacent letters"" from only one row

```

```

or one column"
610 PRINT"" LEAVE just ONE letter
to WIN!!!"
620 VDU7
630 ENDPROC
640 :
650 DEFPROCmove
660 ok=TRUE
670 IFturn%=1col%=1:pitch%=149:pl$="
A"ELSEcol%=3:pitch%=165:pl$="B"
680 COLOURcol%
690 PRINTTAB(12,22)"Player("pl$")";
700 COLOUR2:PRINT" TO GO"
710 REPEAT
720 COLOURcol%
730 PRINTTAB(30,30)SPC6
740 INPUTAB(4,30)"SELECT your lette
rs now..."L$;
750 PROCtest
760 IFok=FALSE SOUND1,-10,0,8
770 UNTILok=TRUE
780 SOUND1,1,pitch%,8
790 FORJ%=1TOLENL$
800 pic$(J%)=MID$(L$,J%,1)
810 asc%=ASC(pic$(J%))-65
820 x%=asc%MOD4:y%=asc%DIV4
830 COLOURcol%
840 PRINTTAB(4*x%+12,4*y%+5)blank$
850 plak$(asc%)=""
860 NEXT
870 count%=count%-LENL$
880 turn%=turn%
890 ENDPROC
900 :
910 DEFPROCtest
920 ok=TRUE
930 IF LEN L$>4 OR LEN L$>count% OR
LEN L$=0 ok=FALSE:ENDPROC

```

```

940 I%=1:tot%=0:REPEAT:r%=INSR(row$
(I%),L$):c%=INSR(col$(I%),L$):tot%=to
t%+r%+c%
950 I%=I%+1:UNTILI%>4:IFTot%=0 ok=FA
LSE:ENDPROC
960 J%=1
970 REPEAT
980 pic%=MID$(L$,J%,1)
990 IFplak$(ASC(pic%)-65)="" ok=FA
LSE:J%=LENL$
1000 asc%(J%)=ASC(pic%)-65
1010 J%=J%+1
1020 UNTILJ%>LENL$
1030 IFok=FALSE ORLENL$=1 ENDPROC
1040 J%=2
1050 REPEAT
1060 diff%=ABS(asc%(J%)-asc%(J%-1))
1070 IFdiff%<1ANDdiff%<4 ok=FALSE:J
%=LENL$
1080 J%=J%+1
1090 UNTILJ%>LENL$
1100 ENDPROC
1110 :
1120 DEFPROCend
1130 PRINTTAB(4,25)SPC240;
1140 IFturn%=1 B%=B%+1 ELSE A%=A%+1
1150 COLOUR1:PRINTTAB(8,3);A%
1160 COLOUR3:PRINTTAB(34,3);B%
1170 COLOUR2:PRINTTAB(21,22)" WINS!";
1180 FORpitch%=101TO149STEP4
1190 SOUND1,1,pitch%,1:NEXT
1200 FORpitch%=145TO101STEP-4
1210 SOUND1,1,pitch%,2:NEXT
1220 COLOUR2
1230 PRINTTAB(5,26)"Press RETURN to c
ontinue...";
1240 dummy=GET
1250 ENDPROC

```

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# Taking discs apart

**Roland Waddilove shows how the DFS directory of files is structured**

**T**HIS second article in our series investigating discs is devoted to exploring the disc filing system's directory structure. Not only is it interesting looking at how the DFS stores the information related to each file – like its name, length, load and execution addresses – but it is also useful to know how to reconstruct it when things go wrong and you lose a file.

The DFS directory occupies the first two sectors on the disc – Figure I shows a hex/Ascii dump of a typical one. The first eight characters of the 12 character title are stored in the first eight bytes of sector one. You can see R.Waddil in the screen dump.

The rest of the sector is devoted to storing the names of up to 31 files – the maximum the DFS allows you to store on one disc. Each filename can be up to seven characters long – if it's shorter it is padded out with spaces – plus a one character directory name. When a file is locked with \*ACCESS bit seven of the directory byte is set. Figure I shows this quite clearly.

That's the easy part. Sector two, the second half of the directory, is much more complicated. It starts off with the last four bytes of the disc title – ovel – in Figure II. Byte 260 – counting from zero at the start of the directory – stores the number of times the disc has been written to.

Byte 261 holds the number of files saved on the disc multiplied by eight. The upper nybble of the next byte is the boot option as set by \*OPT4,n. The lower nybble plus the whole of the next byte – byte 263 – holds the number of sectors on the disc. With 40 tracks and 10 sectors per track, this will be 400 – or &190 in hexadecimal.

The rest of the directory is used to store the file pointers for the 31 files. These correspond exactly to the filenames in the first sector. So the first file's pointers in sector two belong to the first filename in sector one, the second file's pointers belong to the second filename and so on. Each file's pointers occupy eight bytes.

Bytes zero and one of a file's pointer list contain the least significant 16 bits of the load address – normally this is all you need, however, the others are used if you have a second processor. In Figure II, bytes 264 and 265 hold &1900 the load address of the first file.

Bytes two and three hold the least significant 16 bits of the execution address. In Figure II bytes 266 and 267 hold &8023, indicating that this is a Basic program. Bytes four and five contain the least significant 16 bits of the file's length.

The sixth byte is used to store the most significant two bits of the execution address, length and load address in bits seven and six, five and four, three and two respectively.

The only missing information the DFS requires is where the file is physically located on the disc. The top two bits of the sector number are held in bits one and zero of the sixth byte, and the remainder of the bits are stored in the seventh, final byte.

As you can see, the file pointer list is quite complicated and to extract the information

The 31 filenames follow the title and are seven letters long

The first eight bytes of the disc title

Disc Catalogue Viewer									
0:	52	2E	57	61	64	64	69	6C	R.Waddil
8:	53	50	52	4F	47	20	20	A4	SPROG .
16:	54	52	49	56	49	41	20	A4	TRIVIA .
24:	44	49	41	40	4F	4E	44	A4	DIAMOND .
32:	50	4F	45	54	52	59	20	A4	POETRY .
40:	54	41	4B	54	49	4B	53	A4	TAKTIKS .
48:	44	41	54	41	20	20	20	A4	DATA .
56:	21	42	6F	6F	74	20	20	24	!Boot \$
64:	44	69	73	63	20	20	20	24	Disc \$
72:	00	00	00	00	00	00	00	00	.....
80:	00	00	00	00	00	00	00	00	.....
88:	00	00	00	00	00	00	00	00	.....
96:	00	00	00	00	00	00	00	00	.....
104:	00	00	00	00	00	00	00	00	.....
112:	00	00	00	00	00	00	00	00	.....
120:	00	00	00	00	00	00	00	00	.....

Press a key...

The directory follows each filename. If bit seven is set then the file is locked

Figure I: The first sector of the directory holds the first eight bytes of the title and the 31 filenames

Disc Catalogue Viewer									
256:	6F	76	65	21	11	40	31	90	ove!.01.
264:	00	19	23	80	B2	17	CC	32	..#...2
272:	00	20	23	80	D0	08	CC	29	..#...)
280:	00	19	23	80	F9	10	CC	18	..#...)
288:	00	19	23	80	A3	05	CC	12	..#...)
296:	00	19	23	80	74	09	CC	08	..#...t...
304:	FF	FF	FF	FF	DF	01	CC	06	.....
312:	00	00	00	00	0C	00	00	05	.....
320:	00	19	23	80	EF	02	CC	02	..#...)
328:	00	00	00	00	00	00	00	00	.....
336:	00	00	00	00	00	00	00	00	.....
344:	00	00	00	00	00	00	00	00	.....
352:	00	00	00	00	00	00	00	00	.....
360:	00	00	00	00	00	00	00	00	.....
368:	00	00	00	00	00	00	00	00	.....
376:	00	00	00	00	00	00	00	00	.....

Press a key...

The 32 files' pointers follow the first eight bytes

Figure II: The rest of the disc title, some disc information, and the 31 files' pointers are stored in the second sector of the directory

Turn to Page 24 ►



# ◀ From Page 23

you'll have to take bytes and mask off the bits you don't need, then add in other bytes, and so on. Not an easy task by any means.

The listing is a Basic program that allows you to examine a disc's directory. Simply pop a disc in the drive and run it. The information is printed out in hexadecimal and Ascii in 128 byte chunks. Press a key to move on to the next chunk.

An osword call - &7F - is used to read the directory sectors straight off the disc. Osword &7F can perform a variety of functions, from reading and writing individual sectors to formatting a whole track. A parameter block is used for reading sectors and it must be 11 bytes long. Here is how it is structured:

Byte 0	= Drive
Byte 1-4	= Buffer address
Byte 5	= Number of parameters
Byte 6	= Function number
Byte 7	= Track number
Byte 8	= Sector number
Byte 9	= Sector size/number
Byte 10	= Used to report errors

The number of parameters in byte five is three in our case - the track, sector and sector size/number. The osword function number in byte six is &53. Bytes seven and eight hold the track and sector number.

Byte nine has a dual function. The top three

bits tell the disc controller how many bytes there are in a sector, and a value of 1 is required in our case to specify a size of 256 bytes. The least significant five bits represent the number of sectors per track - 10 on a DFS disc. So byte nine must be set to &22 to read the two directory sectors.

```

10 REM Read catalogue
20 REM By R.A.Waddilove
30 REM (c) Electron User
40 MODE 6
50 VDU 19,0,4;0;
60
70 DIM buffer 550
80 DIM block 11
90
100 osword=&FFF1
110 drive=0
120 track=0
130 sector=0
140 parameters=3
150 command=&53
160
170 ?block=drive
180 block!1=buffer
190 block?5=parameters
200 block?6=command
210 block?7=track
220 block?8=sector
230 block?9=&22
240 A=&7F
250 X=block MOD 256

260 Y=block DIV 256
270 CALL osword
280 IF block?10<>0 PRINT "Error":END
290
300 @=&000904
310 FOR K=0 TO 3*128 STEP 128
320 CLS
330 PRINT TAB(7,2) "Disc Catalogue Vi
    ew"
340 PRINT
350 FOR I=0 TO 15*8 STEP 8
360 a$=""
370 PRINT I+K;" ";
380 FOR J=0 TO 7
390 byte=? (buffer+K+I+J)
400 IF byte<32 OR byte>126 a$=a$+","
    ELSE a$=a$+CHR$(byte)
410 PRINT " ";-byte DIV 16;-byte MOD
    16;
420 NEXT
430 PRINT " ";a$
440 NEXT
450 PRINTTAB(10,22) "Press a key...";
460 dummy=GET
470 NEXT
    
```

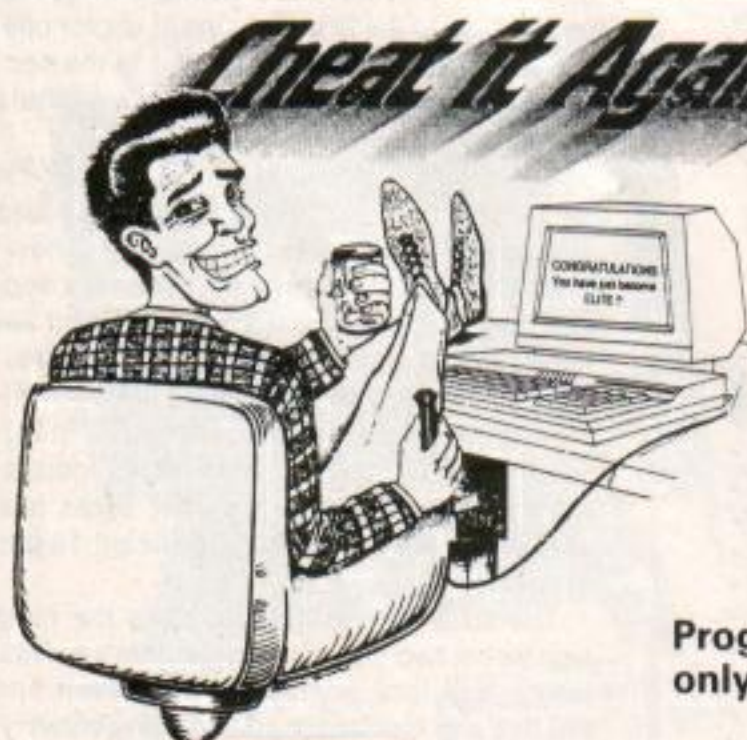
Line 70 in the program reserves 550 bytes of memory to store the two sectors, and line 80 reserves 11 bytes for the parameter block. Lines 170-239 set up the parameter block and then the osword function is called. The remainder of the program is devoted to displaying the data loaded into the buffer.

electron  
user

MAIL ORDER OFFERS

electron  
user

MAIL ORDER OFFERS



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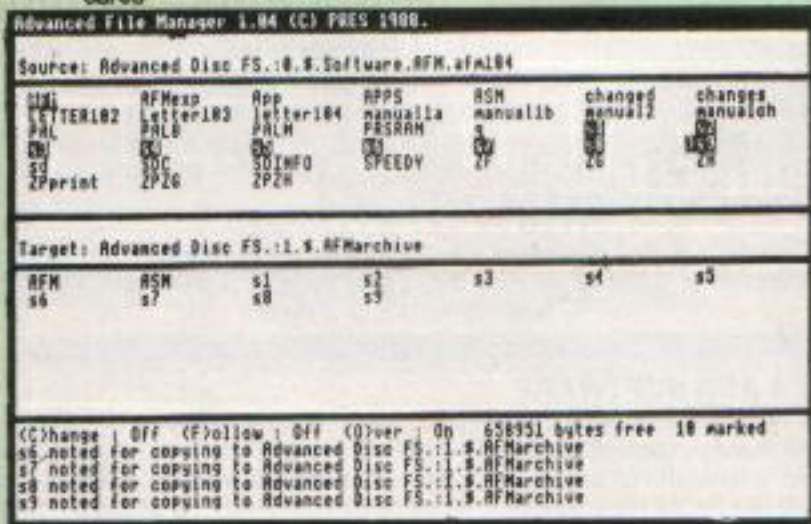
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Screen picture shows AFM in Copy mode on Master Turbo

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**COPY** - the strongest feature of AFM. It is a two stage copy routine. With both source and target directories shown on screen the files to be copied are marked. Once all the files have been marked copying is started and the computer can be left to get on with it!

Large files can be split across several disks, and recombined.

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\*\*STOP PRESS\*\*

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ADFS E00 supplied; 3.5" ADFS (manual available separately)

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The requirement for Electron Music 5000 is ... Electron, Plus 1, disc system (3.5 or 5.25 drive) running DFS or ADFS (preferably @ &E00) i.e. Acorn Plus 3, A.P.3 or A.P.4, 1 MHz bus (best option A.P.5.), and hi-fi amplifier or similar (Music 5000 has a standard 5-pin DIN audio connector for sound output). (Please state disc size & FS when ordering) **£99.00 (ex. VAT) £113.85 (inc. VAT)**

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Press 1, 2 or 3: 3...Correct!

### Thinking...

```

820 ? (6900+Q%*2)=? (6900+R%*2)
830 ? (6900+R%*2)=T%
840 T%=? (6901+Q%*2)
850 ? (6901+Q%*2)=? (6901+R%*2)
860 ? (6901+R%*2)=T%
870 NEXT
880 ENDPROC
890
900 DEF PROCnext
910 REPEAT
920 ptr=ptr+1
930 UNTIL ?ptr=ASC"*" OR ?ptr=ASC"@"
940 ENDPROC
950
960 DEF PROCcls
970 VDU 26
980 FOR I%=1 TO 5
990 PRINT STRING$(200,CHR$(224));
1000 NEXT
1010 ENDPROC
1020
1030 DEF PROCwindow (X%, Y%, W%, H%)

```

A vintage beige computer monitor and keyboard are placed on a black leather office chair. The monitor screen displays a large green question mark. The chair has a five-point base and armrests. The background is a plain, light-colored wall.



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**John Geraghty presents  
a super-fast machine  
code replace facility**

**H**OW often have you started to write a program, then halfway through decided that your choice of variable names wasn't as good as it could have been? Sometimes we start off using short, single letter variables, then as the program grows in complexity and becomes more difficult to read we wish we had used more meaningful ones.

Or perhaps long meaningful ones are used, then we find we are short of memory and the program will not run unless we shorten them.

It happens all too often, and at such times the only solution is to go through the program line by line and laboriously change each occurrence of the old variable name to the new one. The longer the program, of course, the more tedious and time-consuming the task.

However, help is at hand in the form of a very fast and powerful machine code utility called Replace. The program listed here assembles a short machine code routine into page &C00, which is normally reserved for character definitions, but as these won't be needed during the typing-in phase of a program, it should be free.

When the program is run the machine code is automatically saved to disc - don't forget to save the source code listing too, but under

# Try ringing the changes

a different filename. You can type NEW to get rid of the program, and either start typing in at the keyboard or load any Basic program from disc or tape.

Before using Replace you must enable the routine by calling &C00, and this must also be done if you simply \*LOAD the machine code too. To replace the variable *n*, say, with *number* you would type:

```
DEFn=number
```

Everything between the F and the equals sign is replaced by everything after the equals.

In general terms, to replace *oldname* with *newname* the syntax is:

```
DEFoldname=newname
```

The utility has some unexpected features. You can search for and replace Basic keywords. This means that you could replace every occurrence of PRINT with RETURN. This isn't much use, however, as it will make nonsense of your program, but is a point to be wary of.

To disable the replace facility enter END at the keyboard.

```
10 REM RSOURCE
20 REM By John Geraghty
30 REM (c) Electron User
40 MODE6
50 PROCassemble
60 PRINT "Press <RET> to save REPLA
CE"
70 REPEAT UNTIL GET=13
80 *SAVE REPLACE C00 D00
90 END
100 :
110 DEF PROCassemble
120 search=&100
130 replace=&140
140 stringv=&70
150 slen=&72
160 rlen=&73
170 lineaddr=&74
180 llen=&76
190 temp=&77
200 def_tkn=&D0
210 end_tkn=&E0
220 page=&18
230 input=&700
240 wrchr=&20E
250 oswrch=&DE2D
260 insert_line=&BC8D
270 :
280 FOR pass=0 TO 2 STEP2
290 P=&C00
300 [OPT pass
310 LDX #main MOD&100
320 LDY #main DIV&100
330 .change_vector
340 SEI
```

```
350 STX wrchr
360 STY wrchr+1
370 CLI
380 RTS
390 :
400 .main
410 PHP
420 PHA
430 TGA
440 PHA
450 TYA
460 PHA
470 :
480 LDA input
490 CMP #end_tkn
500 BEQ restore_vector
510 CMP #def_tkn
520 BNE exit
530 :
540 LDX #search MOD&100
550 STX input
560 STX stringv
570 STX lineaddr
580 LDA page
590 STA lineaddr+1
600 LDY #search DIV&100
610 STY stringv+1
620 LDA #ASC"=" \string delimiter
630 JSR save_strings
640 BEQ exit
650 STY slen
660 :
670 LDA #replace MOD&100
680 STA stringv
690 LDA #&0D \string delimiter
```

```
700 JSR save_strings
710 BEQ exit
720 STY rlen
730 :
740 .check_a_line
750 LDY #1
760 LDA (lineaddr),Y
770 BMI exit \ie. if TOP
780 INY
790 INY
800 LDA (lineaddr),Y
810 .recheck
820 STA llen
830 JSR instr
840 BEQ next_line
850 JSR edit
860 BEQ next_line
870 LDA temp
880 BNE recheck \always
890 .next_line
900 LDY #3
910 LDA (lineaddr),Y
920 CLC
930 ADC lineaddr
940 STA lineaddr
950 BCC check_a_line
960 INC lineaddr+1
970 BNE check_a_line \always
980 :
990 .restore_vector
1000 LDX #&2D
1010 LDY #&DE
1020 JSR change_vector
```

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1030 :	1370 LDX slen	1720 LDA temp
1040 .exit	1380 .iloop	1730 CLC
1050 PLA	1390 DEY	1740 ADC slen
1060 TAY	1400 DEX	1750 TAY
1070 PLA	1410 BMI ssend	1760 DEY
1080 TAX	1420 CPY #3	1770 DEX
1090 PLA	1430 BEQ ssfail	1780 .tail
1100 PIP	1440 LDA (lineaddr),Y	1790 INX
1110 JMP cswrch	1450 CMP search,X	1800 BEQ efail
1120 :	1460 BNE instr	1810 INY
1130 .save_strings	1470 BEQ iloop	1820 LDA (lineaddr),Y
1140 STA temp	1480 :	1830 STA input,X
1150 LDY #0	1490 .edit	1840 CMP #&00
1160 .ssloop	1500 INY	1850 BNE tail
1170 INX	1510 STY temp	1860 :
1180 LDA input,X	1520 LDY #0	1870 \line no. into IntA...
1190 CMP temp	1530 .head	1880 LDY #1
1200 BEQ ssend	1540 LDA (lineaddr),Y	1890 LDA (lineaddr),Y
1210 CMP #&00	1550 STA input,Y	1900 STA &2B
1220 BEQ ssfail	1560 INY	1910 INY
1230 STA (stringv),Y	1570 CPY temp	1920 LDA (lineaddr),Y
1240 INY	1580 BNE head	1930 STA &2A
1250 CPY #&40	1590 :	1940 :
1260 BNE ssloop	1600 LDX #0	1950 \set up string pointer...
1270 .ssfail	1610 .middle	1960 INY
1280 LDA #0	1620 LDA replace,X	1970 INY
1290 RTS	1630 STA input,Y	1980 STY &37
1300 .ssend	1640 INY	1990 LDA #7
1310 TYA	1650 BEQ efail \if string is too	2000 STA &38
1320 RTS	long	2010 JSR insert_line
1330 :	1660 INX	2020 LDA #1
1340 .instr	1670 CPY rlen	2030 .efail
1350 LDY llen	1680 BNE middle	2040 RTS
1360 DEC llen	1690 :	2050 :
	1700 TYA	2060 ]:NEXT:ENDPROC
	1710 TAX	

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# Romarkably helpful?

**M**Y micro is already pretty full of roms, but here is yet another from that respected supplier of quality Electron products, Pres. The latest addition to the range is Advanced File Manager (AFM) which is designed to take all the hard work out of managing your discs efficiently.

AFM comes on a bare rom chip which means you must have some means of plugging it into your Electron. The Plus 6 and Rombox Plus have suitable rom sockets built in, but Plus 1 owners will need a cartridge with a blank rom socket.

The other requirement is a monitor, as the software runs in 80 column Mode 0 and the text may be difficult or impossible to read on a colour television. I'm assuming, of course, that you've got either a DFS or ADFS disc system.

The rom can be called up with the command \*AFM. The screen changes to Mode 0 and five windows are drawn as shown in the screen dump. It's worth noting that AFM remembers both the mode you were in and the colour palette when it was called up, and restores them when you exit.

Both ADFS and DFS users can alter the screen colours by pressing the minus sign for the foreground and equals for the background.

The rom has four main functions, Menu, Delete, Rename and Copy. The default is Menu and this function allows you to examine all the files on a disc and move back and forth through the directories. The files are displayed in the second window.

The options vary slightly depending on whether you are using the DFS or ADFS. ADFS users can enter a directory by moving the cursor to the directory name using the cursor keys and then pressing the Return key. You can move back up the directory structure by pressing ^, or return to the root directory with \$.

Running a program is a simple matter of moving the cursor to it in window two and pressing the Return key to signal your choice. Window four clears and a list of options pops up. You can choose from CHAIN, LOAD, \*TYPE, \*DUMP, \*LIST, \*RUN and \*EXEC by using the cursor up and down keys and pressing Return.

Pressing the spacebar changes the currently selected window, so tapping this once enables you to move to window three and alter the operating mode with the cursor keys. The Delete facility allows you to tag files then delete them all in one go.

After setting Delete mode and tapping the spacebar until you get back to window two,

**Do you find tidying up your discs tedious and time consuming? A rom designed to ease the problem is tried by Roland Waddilove**

you can mark files by moving to them and pressing the Return or Delete keys. The filename is highlighted by inverting the colours. If you want to delete them all you just press Control+I. The Copy key is pressed to carry out the operation.

The advantage of this command is that files with widely differing filenames that can't be matched with a wildcard can be deleted in one operation. The disadvantage is that the procedure is cumbersome.

The Copy facility enables you to tag files, as with Delete, and after selecting the destination drive it then copies them. The operating mode is changed by tapping the spacebar until window three is active, then using the cursor keys to highlight Copy.

Pressing the spacebar clears window four and you are prompted to set the destination drive and directory. This done, you automatically move back to window two to tag the

files you want to copy. The cursor is moved with the cursor keys and Return selects them. When you have tagged all the files, pressing the Copy key starts the operation.

Several things can go wrong during this task and the two most common problems occur when the disc is full and when the destination disc contains a file with the same name. A disc full error brings up a menu which has options to abort the current file copy, stop the whole operation, continue on another disc, retry, select a new path and so on. You can split a very large file over two discs.

If the destination disc contains a file of the same name you have the option to abort the current file copy, stop the whole process, overwrite it, delete it or extend it so that the current file is tagged on to the end of the destination file. This is useful for merging two files.

The Copy function is intelligent in that it makes use of any available spare ram. So if, for instance, you have sideways ram or ABR, this will be used to buffer the files so that more can be copied in one go.

The final function of AFM, Rename, is the most complex and difficult to get to grips with. To select it you tap the spacebar until the third window is active and use the cursor keys to highlight Rename. Then you go to the

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Advanced File Manager 1.07			
Filing System: Disc FS.		Drive: 0	
Directory: \$			
DISCSAVE	SHEET	VIEW	DATA
PACMAN	INVADER	DISCMEN	PROG1
Advanced File Manager Operating Mode :			
Menu	Delete	Rename	Copy
SWR F	SWR 7 DFS		
SWR E	SWR 6 ADT		
SWR D	SWR 5		
SWR C PRES Plus 1	SWR 4 PRES ADFS		
SWR B	SWR 3 ACP		
SWR A	SWR 2 AFM		
SWR 9	SWR 1 T2PEG400		
SWR 8	SWR 0 PEGASUS 400		
Rename String : <Rename OFF>			

The Advanced File Manager's workscreen



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second window to highlight the file to be renamed – the same way as with the other options – and finally go to window five to enter the new filename. The Copy key executes the operation.

The only problem is that in one tenth the time it takes to carry this out I could have typed in a rename command at the keyboard. However, that's not the end of Rename's options. It is possible to use wildcards and rename more than one file at once, though I haven't found a use for this.

You can select more than one file for renaming by moving to each one in window two and pressing Return. When you enter the rename string in window five Control+1 represents the first character of the existing filename, Control+2 represents the second, Control+3 the third and so on.

These characters will not be changed by the rename operation, but the rest of the name will be. So what this means is that, for instance, you could rename the files APROG, BPROG and CPROG to ATEXT, BTEXT and CTEXT by typing Control+0 followed by TEXT for the rename string.

I must say that I'm not fully convinced that Advanced File Manager is worth the asking price of £34.50. Some of the functions provided are quite useful, but I found many rather cumbersome and slow and I could type them

in at the keyboard in a fraction of the time it took to boot up the rom, set all the parameters and execute the command.

I also experienced problems due to some sort of clash with the existing roms in my micro which meant that AFM wouldn't work properly until they had been disabled.

If the price was reduced to around £10-15 then I would be more enthusiastic, but as it

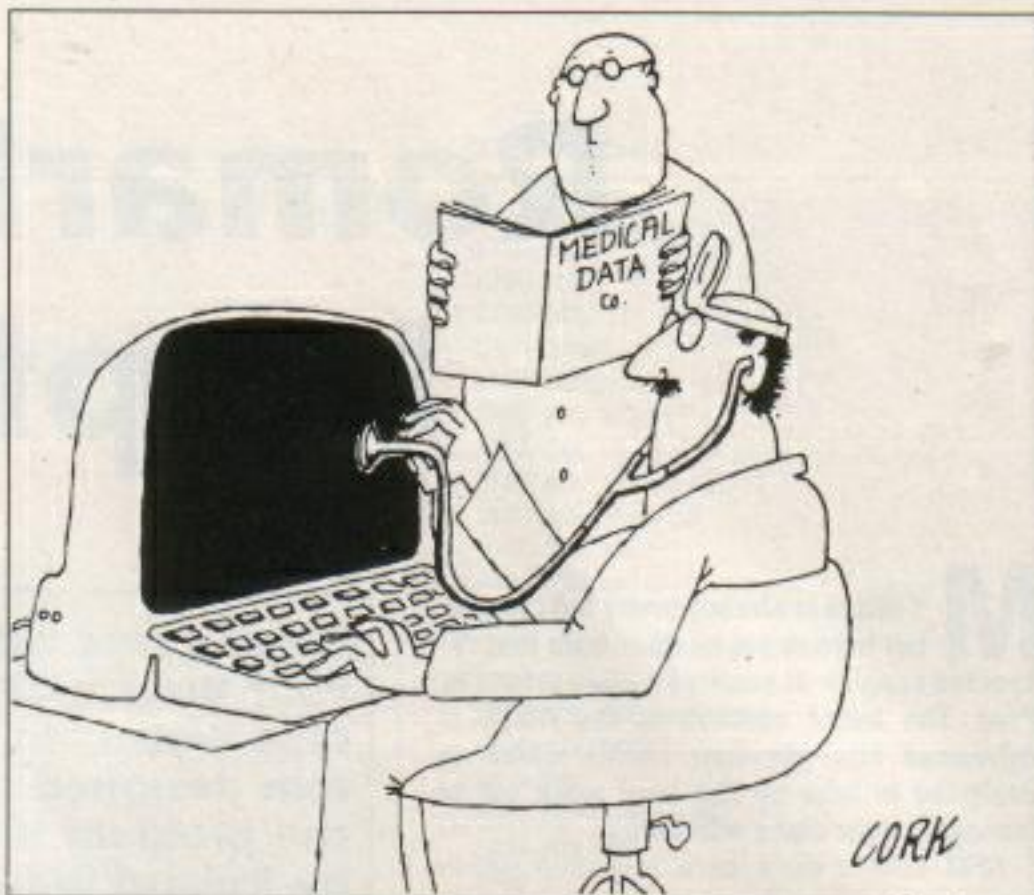
stands it can't be compared to other superb Pres roms like ADT and ADI which are bristling with genuinely useful features.

Product: Advanced File Manager

Price: £34.50

Supplier: Pres, 6 Ava House, High Street, Chobham, Surrey GU24 8LZ

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## The problem of language acquisition

Title: *Computer Languages – a guide for the perplexed*

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**T**HERE is quite a plethora of programming languages available for the Electron and its big brother the BBC Micro – Basic, Pascal, Forth, Logo – and it seems that new ones crop up almost every week. After experimenting with Basic, many aspiring programmers look around for something a little better. But with such a wide choice available, which language is best?

This is the dilemma facing many people that this book attempts to dispel. By educating the reader and expanding his knowledge of what is available it enables him to make a much better and wiser choice of software.

After all, a great deal of time and effort must be put into learning a new language, so the task is not to be taken lightly.

The author starts with a discussion of computer languages in general, and examines whether or not they are in fact true languages like English and French. She then moves on to chronicle the growth of computer languages.

Finally, in the first section, she compares the structure of languages and the various methods of classifying them, and looks at the ways in which they handle data.

The major portion of the book deals with a description of 22 different languages. This isn't intended to be a programming tutorial, though there are one or two brief listings. These are used merely to illustrate a particular aspect of the language being discussed.

A fair proportion of the text is devoted to the history of each language, as once you know by whom, for what reason, and where a particular language was developed it becomes much easier to understand why it is so popular – or not so popular – and why it is used for solving a particular type of programming problem.

Did you know for instance, that Ada was named after Augusta Ada Byron, Countess of Lovelace, and inventor of the stored program? And that it was specifically designed for controlling military hardware?

It is often said that the camel is a horse designed by a committee. Well, Ada is the ultimate computer language, and was designed by the biggest committee of all – the US military – which explains a lot, if you've ever met the language.

APL – A Programming Language would you

believe? – must rate as one of the strangest languages around. It is often called a write only language as once you've written a program, you have no chance of reading and understanding it the next day!

There are many more examples I could quote, but that would spoil your enjoyment of the book. If you have an interest in computer languages, or if you simply want to know why structured Pascal programmers sneer at Basic hacks with their spaghetti-like code, then I can recommend this as a good read.

It won't teach you programming, but it will give you the knowledge and understanding to make a better choice of language to learn.

Roland Waddilove



Book review



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Cheshire Cat **FUN WORDS** includes:-

- Learn Word – sight vocabulary.
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- Lots of – introducing plurals

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Right answers to a problem brings a Cheshire Cat grinning from the screen, a correct tick and a happy tune. Wrong answer and the program gives the unsuccessful child extra help.

Includes:-

- Counting: Keep count of Kicker Kangaroo's goal scoring
- Number Recognition: Sail the required number of boats into harbour. Put the right coloured shapes into sets.
- Sorting: An easy introduction to sums and to those + and = symbols-coloured beads give a visual aid.
- Addition: A fun hello to the important concept of sequences.
- Patterns: Spot the highest flower an exercise in visual perception.
- Tallest: and much, much more...

### Adder Sums Age 7-8 yrs.

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Each child's name is entered at the start and a complete record of results kept. All **ADDER SUMS** games can be set at one of two ability levels with up to any number of tries per child in each.

Right answers bring a Cheshire Cat grinning from the screen, who quickly steps in to help the child in difficulty.

Cheshire Cat **ADDER SUMS** includes:-

- Multiplication: Calculate the cost of items shown in the grocer's shop window.
- Addition: Correctly total the shopping bill from the grocers
- Division: Share out the biscuits using the simple technique provided.
- Time: Learn to tell the time of day, days of the week and the months of the year.
- Tables: Make a start or improve on those important times tables.

### Sum Takeaway (Maths Level 2) Age 6-7 yrs.

Nineteen flexible exercise programs of games for up to four children are contained on twin cassettes or disk programmed for your home computer.

Each child's name is entered at the start and a complete record of results kept. All games can be set at two ability levels with up to 100 games for each exercise.

Right answers bring a Cheshire Cat grinning from the screen, a correct tick and a happy tune. Wrong answer and the program gives the unsuccessful child extra help.

Cheshire Cat **Sum-Takeaway** includes:

- Addition: Full hello to sums.
- Subtraction: Starts with differences and introduces Take Away.
- Charts: Ways of recording information. A vital concept in the child's future.
- Tens & Units: Delightful visual hello to numbers over nine.
- Multiply: First step in those times tables and the 'X' sign.

### Sum Measure Age 9-13 yrs.

Six programs with a choice of 6, 10 or 20 questions are contained on twin cassette or disk programmed for your home computer.

Two chances are given to achieve the correct answer, but don't worry extra help is provided for a child in difficulty.

At the end of each run the results are displayed thereby facilitating the monitoring of the child's progress

Cheshire Cat **SUM MEASURE** includes:-

- Length: Work out the length of a line in centimetres or millimetres.
- Area: Find the area of a rectangle using  $\text{cm}^2$ .
- Volume: Give the volume of a cuboid in  $\text{cm}^3$ .
- Temperature: Work out the temperature shown on the thermometer.
- Mass: Read the correct balance scale
- Capacity: Measure the amount of liquid in the cylinder.

### Sum Times (Maths Level 4) Age 8-9 yrs.

Nineteen flexible exercise programs of games for up to four children are contained on twin cassettes or disk programmed for your home computer. Each child's name is entered at the start and a complete record of results kept. All games can be set at two ability levels with up to 100 games for each exercise. Right answers bring a Cheshire Cat grinning from the screen, a correct tick and a happy tune. Wrong answer and the program gives the unsuccessful child extra help.

Cheshire Cat **Sum Times** includes:

- Tally & Bar Charts: An easy introduction to graphs.
- Time: A moving clock for digital time.
- Tens & Units: Addition & Subtraction of numbers over nine.
- Symmetry: Lines of symmetry.
- Co-ordinates: Important for reading maps and graphs.
- Square Units: Invaluable for calculating areas etc.
- and much, much more...

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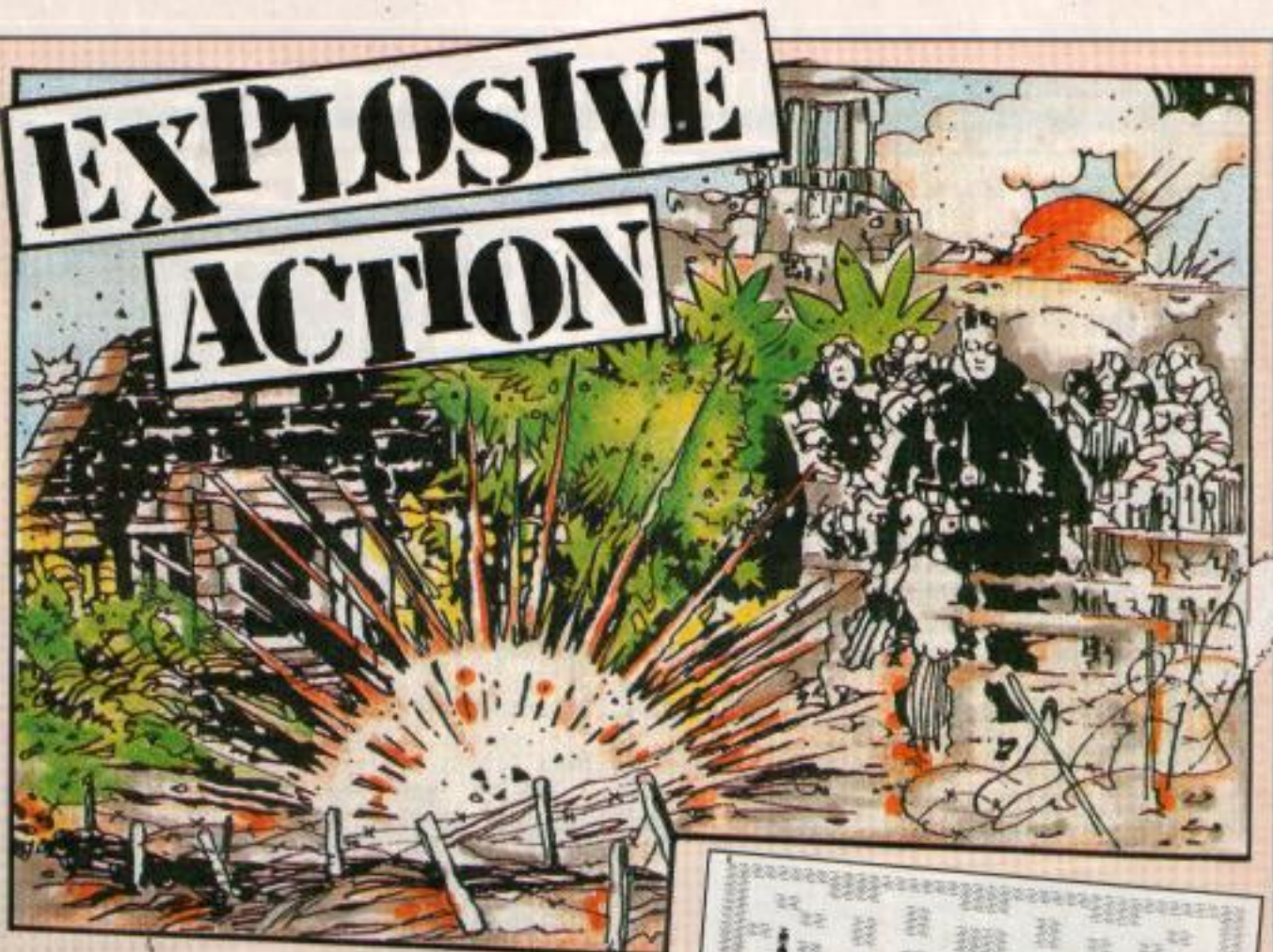
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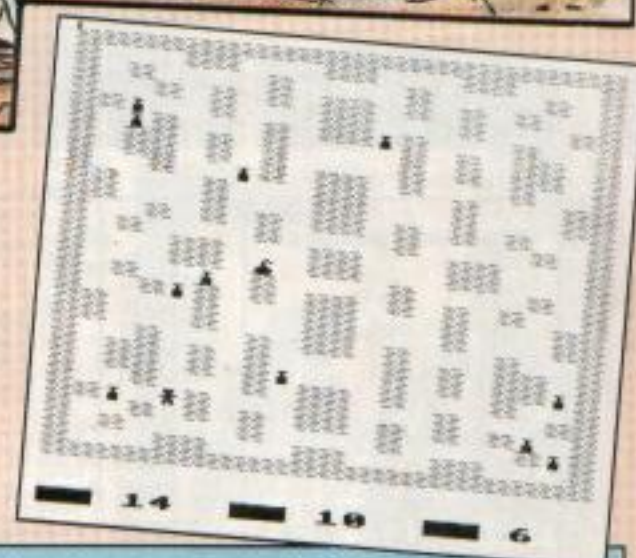


# EXPLOSIVE ACTION



The first bomb will be activated the second you enter the cellar. Your success is vital to the survival of the entire local resistance movement.

After typing in and running the program one or two strange characters will appear. Don't worry, this is due to some of the character set having been redefined. To return the characters to normal, press Control+Break then type OLD and press Return.



Z	Move Left
X	Move Right
.	Move Up
?	Move Down

```

120 VDU 23,1,0;0;0;0;19,2,8;0;19,3,3
;0;
130 VDU 23,35,8,20,16,16,56,124,124,
56,23,38,0,56,16,16,56,56,56,23,33,
56,56,16,124,16,56,40,40,23,42,238,0,1
19,0,238,0,119,0

```

## VARIABLES

DIM S%(19,27)	Copy of screen
DIM A\$(13)	The maze
X%,Y%	Your coordinates
BX%,BY%	Bomb coordinates
MX%,MY%	Mine coordinates
HI%	High score
SC%	Your score

```

170 PRINTTAB(0,28)STRING$(60," ");:*
FX10,5
180 COLOUR 131:COLOUR 1:PRINTTAB(0,3
0)"SC"TAB(7,30)"H1"TAB(14,30)"T1":COLO
UR 128
190 REPEAT:XX=RND(17)+1:YX=RND(25)+1
:UNTIL SX(XX,YX)=32:SX(XX,YX)=33
200 REPEAT:CX=CX-1:SCX=SCX+1
210 IF BX=0 COLOUR 3:REPEAT:BX=RND(
17)+1:BY=RND(25)+1:UNTIL SX(BX,BY)=
32:PRINTTAB(BX,BY)"#":SX(BX,BY)=35
:BX=1
220 IF MX=0 COLOUR 2:FOR IX=1 TO MF
:REPEAT:MX=RND(17)+1:MY=RND(25)+1:UN
TIL SX(MX,MY)=32:PRINTTAB(MX,MY)"&
":SX(MX,MY)=38:NEXT:MX=1:MF=1
230 SX(XX,YX)=33:PRINTTAB(XX,YX)" "
240 REPEAT:HX=(INKEY-98 AND XX>1)-(I
NKEY-67 AND XX<18):VX=(INKEY-73 AND YX
>1)-(INKEY-105 AND YX<26):UNTIL SX(XX+
HX,YX+VX)<>42
250 XX=XX+HX:YX=YX+VX:IF HX OR VX SO

```

```

UND 1,-15,5,1
260 COLOUR 3:PRINTTAB(X,Y%)"!":*FX2
1
270 IF S%(X%,Y%)=35 S%(X%,Y%)=32:FOR
L%=100 TO 500 STEP 25:SOUND 2,-15,L%,
1:NEXT:SC%=SC%+C%-1:B%=0:M%=0:C%=100:D
%=INKEY(50)
280 COLOUR 3:PRINTTAB(3,30);SC%DIV10
;TAB(10,30);H1%;TAB(17,30);C%DIV10";
:IF C% MOD 10=0 SOUND 1,-15,150,3
290 UNTIL C%DIV10<1 OR S%(X%,Y%)=38
300 IF S%(X%,Y%)=38 COLOUR 129:COLOU
R 2:PRINTTAB(0,28)" STEPPED ON A MINE
"; ELSE COLOUR 129:COLOUR 2:PRINTTAB(
0,28)" BOMB HAS EXPLODED ";
310 IF SC%DIV10>H1% H1%=SC%DIV10
320 COLOUR 128:VDU 19,0,9,0;0;:FOR L
%=200 TO 0 STEP -5:SOUND 0,-15,L%,1:NE
XT:VDU 19,0,0;0;:*FX9,20
330 FOR I%=0 TO 19:FOR J%=0 TO 27
340 IF S%(I%,J%)<>42 S%(I%,J%)=32:PR
INTTAB(I%,J%)" "
350 NEXT:J%:D%=INKEY(100):*FX10,40
360 COLOUR 2:PRINTTAB(0,28)"PRESS a
KEY TO START":FOR L%=200 TO 100 STEP -
10:SOUND 3,-15,L%,1:NEXT:*FX21
370 KS=GET$:UNTIL KS="N":CLS:END
380 DATA*****
390 DATA* ** ** *
400 DATA* * * *
410 DATA* * * * * *
420 DATA** * ** * **
430 DATA* * * * * *
440 DATA* ** * * * *
450 DATA* ** * * * *
460 DATA* * * * * *
470 DATA** * ** * **
480 DATA** * ** * **
490 DATA* * * * * *
500 DATA* * * * *
510 DATA* ** ** *
520 DATA* *****

```



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March 1989 ELECTRON USER 45



**T**HE year is 1,000,000 BC and dinosaurs are the rulers of the Earth. Sprog, an intrepid caveman adventurer, is a little short on cash to finance his latest adventure so he sets out to find a fabled buried treasure chest containing untold riches.

No one knows its precise location, but it is said to lie many leagues to the east. Several adventurers have tried to discover its location before, but all have perished in the quest. Can you succeed in this perilous mission?

You control Sprog and guide him across a sideways scrolling landscape in search of the chest. There are several hazards to watch out for, including great pits and flying boulders. Fortunately, you are quite athletic and can leap great distances, so these obstacles shouldn't be too much of a problem.

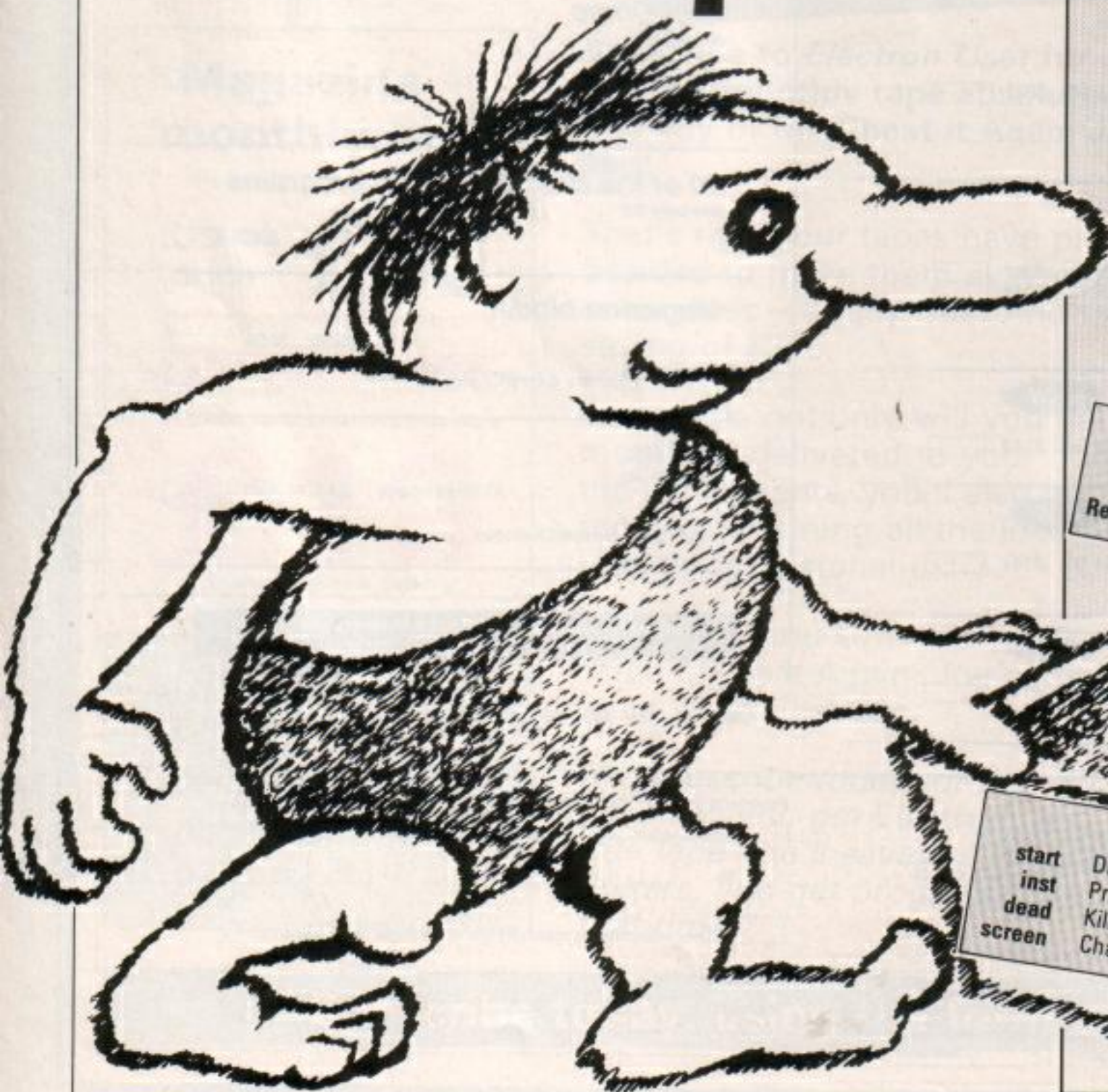
Sprog is a multi-screen game and bonus points are awarded for completing each level. The keys are Z and X to move left and right,

**Jaunt right back to 1,000,000 years BC and help Sprog find buried treasure in this tricky game by Graham Barlow**

and Return to jump. As you progress through the screens they become more difficult – you'll have to contend with multiple pits and several flying boulders at once.

Don't type in the space after the line number when entering the program. Watch out for the tick character – on the 7 key – as two together can look like a quote. Also some variables start with a capital letter O and could be confused with zero at a cursory glance.

# Caveman capers



```

10 REM Sprog
20 REM By Graham Barlow
30 REM (c) Electron User
40 ON ERROR MODE6:PRINT:REPORT:PRIN
T" at line ";EPL:END
50 MODE6:PROCinst:MODE5
70 VDU23,224,&0,&1,&3,&F,&1F,&3F,&7
F,&FF
80 VDU23,225,&80,&C0,&E0,&F0,&F0,&F
8,&FC,&FF
90 VDU23,226,&0,&0,&0,&0,&0,&38,&7C
,&FF
100 VDU23,227,&AA,&FF,&FF,&FF,&FF,&F
F,&FF,&FF
110 VDU23,228,&0,&C0,&E0,&E0,&F0,&F8
,&FF,&FF
120 VDU23,229,&0,&3,&7,&7,&F,&1F,&FF
,&FF
130 VDU23,230,&FF,&FF,&FF,&FF,&FF,&F
F,&FF,&FF
140 VDU23,231,&0,&0,&1,&3,&6,&E,&1E,
&1E
150 VDU23,232,&0,&F0,&F8,&F,&61,&4F,
&10,&20
160 VDU23,233,&11,&21,&47,&49,&51,&5
E,&50,&68
170 VDU23,234,&40,&20,&10,&10,&18,&1
4,&14,&1C
180 VDU23,235,&4,&7,&18,&33,&24,&24,
&12,&1E
190 VDU23,236,&20,&E0,&A0,&A0,&A0,&B
8,&88,&F8
200 VDU23,237,&4,&7,&B,&B,&12,&14,&2
3,&3F
210 VDU23,238,&20,&E0,&20,&A0,&90,&4
8,&24,&3E
220 VDU23,239,&0,&3C,&7E,&FF,&FF,&7E
,&3C,&0
230 VDU23,240,&0,&0,&1,&6,&8,&3C,&43
,&41
240 VDU23,241,&0,&F8,&4,&4,&2,&6,&A,
&32
250 VDU23,242,&FF,&81,&81,&81,&81,&8
1,&FF,&0
260 VDU23,243,&C2,&82,&84,&88,&90,&A
0,&C0,&0
270 VDU23,244,&1,&7,&C,&3D,&FC,&3F,&
C,&7

```

**CONTROLS**  
Z Left  
X Right  
Return Jump

**VARIABLES**  
X,Y Position of the mountains  
OX,OY Position of the ground  
O%,P% Sprog's position  
SC% Score  
HI% High score  
NAMES Name of highest scorer

**PROCEDURES**  
start Draws the screen  
inst Prints the instructions  
dead Kills you off  
screen Changes colours and windows



```

280 VDU23, 245, &FF, &FF, &44, &D5, &44, &5
D, &5D, &FF
290 VDU23, 246, &FF, &FF, &73, &6D, &ED, &6
D, &B3, &FF
300 VDU23, 247, &FE, &FF, &1D, &7D, &45, &6
F, &D, &FE
310 ENVELOPE 1, 1, 9, 8, 7, -3, -2, -1, 126,
0, 0, -126, 126, 126
320 VDU23, 1, 0, 0, 0, 0;
330 A$=CHR$224+CHR$225+CHR$224+CHR$2
25+CHR$226+CHR$226+CHR$224+CHR$225+CHR
$226+CHR$224+CHR$225+CHR$226+CHR$226+C
HR$224+CHR$225+CHR$226+CHR$224+CHR$225
+CHR$226+CHR$226
340 C$=STRING$(6, CHR$227)+CHR$228+CH
R$229+STRING$(8, CHR$227)+CHR$228+CHR$2
29+CHR$227+CHR$227
350 E$=STRING$(7, CHR$227)+CHR$228+CH
R$229+STRING$(7, CHR$227)+CHR$228+CHR$2
29+CHR$228+CHR$229
360 G$=STRING$(9, CHR$227)+STRING$(3,
CHR$228+CHR$229)+STRING$(5, CHR$227)
370 I$=STRING$(20, CHR$227)
380 X=0:Y=15
390 O%=0:OY=28
400 O%=1:P%=25
410 OI%=1:P1%=25:T%=1
420 C1%=235:C2%=236:M%=1:count=0
430 BX%=19:BY%=27:OBX%=19:OBY%=27
440 QX%=11:QY%=27:OQX%=11:OQY%=27
450 CX%=18:CY%=26:OCX%=18:OCY%=26
460 LI%=3:SC%=0:HI%=100:HI2%=100
470 LEV%=0
480 NAME$="GRAHAM"
490 PROCscreen
500 B$=A$+A$
510 D$=C$+C$
520 F$=E$+E$
530 H$=G$+G$
540 J$=I$+I$
550 PROCheader
560 COLOUR1
570 PROCstart
580 REPEAT
590 FOR S%= 1 TO LEN A$
600 COLOUR131:COLOUR0:PRINTAB(0, 5)"
0";LI%:TAB(5, 5)"0":LEV%:TAB(15, 2);SC%:
TAB(15, 5);HI%
610 SC%=SC%+1
620 IF SC%>HI% HI%=SC%
630 COLOUR1
640 PRINTAB(X, Y):MID$(B$, S%, LEN A$)
650 COLOUR130:COLOUR1
660 IF T%=1 PRINTAB(CX, OY)MID$(D$, S
%, LEN C$)

```

```

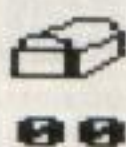
670 IF T%=2 PRINTAB(CX, OY)MID$(F$, S
%, LEN E$)
680 IF T%=3 PRINTAB(CX, OY)MID$(H$, S
%, LEN G$)
690 IF T%=4 PRINTAB(CX, OY)MID$(J$, S
%, LEN I$)
700 IF T%=5 OR T%=6 PRINTAB(CX, OY)M
ID$(J$, S%, LEN I$)
710 IF M%=1 COLOUR2:VDU31, OI%, P1%, 2
31, 232, 8, 8, 10, 233, 234, 8, 8, 10, C1%, C2%:M
%=0
720 IF T%=4 OR T%=5COLOUR2:VDU31, OBX
%, OBY%, 239
730 IF T%=5 COLOUR2:VDU31, OQX%, OQY%,
239
740 IF T%=6 COLOUR2:VDU31, OCX%, OCY%,
240, 241, 8, 8, 10, 242, 243
750 COLOUR0:VDU31, O%, P%, 231, 232, 8, 8,
10, 233, 234, 8, 8, 10, C1%, C2%
760 IF T%=4 OR T%=5 VDU31, BX%, BY%, 23
9
770 IF T%=5 VDU31, QX%, QY%, 239
780 IF T%=6 VDU31, CX%, CY%, 240, 241, 8,
8, 10, 242, 243
790 IF P%=26 PROCdead
800 OI%=OI%:P1%=P1%
810 OBX%=BX%:OBY%=BY%
820 OQX%=QX%:OQY%=QY%
830 OCX%=CX%:OCY%=CY%
840 IF T%=4 AND BX%=0 BX%=19
850 IF T%=5 AND BX%=0 BX%=19
860 IF T%=5 AND QX%=0 QX%=19
870 IF T%=4 OR T%=5 BX%=BX%-1
880 IF T%=5 QX%=QX%-1
890 IF T%=6 CX%=CX%-1
900 IF C1%=235 C1%=237:GOTO920
910 IF C1%=237 C1%=235
920 IF C2%=236 C2%=238:GOTO940
930 IF C2%=238 C2%=236
940 IF T%=6 AND CX%<=O% PROCnextlvl
950 IF T%>=4 AND EX%=O% AND BY%=P%+2
OR T%>=4 AND BX%=O%+1 AND BY%=P%+2 PRO
Cdead
960 IF T%=5 AND QX%=O% AND QY%=P%+2
PROCdead
970 IF T%=5 AND QX%=O%+1 AND QY%=P%+
2 PROCdead
980 *FX21
990 IF INKEY-74 AND POINT(O%*64, 927-
P%*32)=1 P%=P%-5:M%=1:SOUND1, 1, 52, 4
1000 IF POINT(O%*64, 927-P%*32)=2 P%=P
%+1:M%=1
1010 IF INKEY-98 AND O%>0 O%=O%-1:M%=
-1

```

```

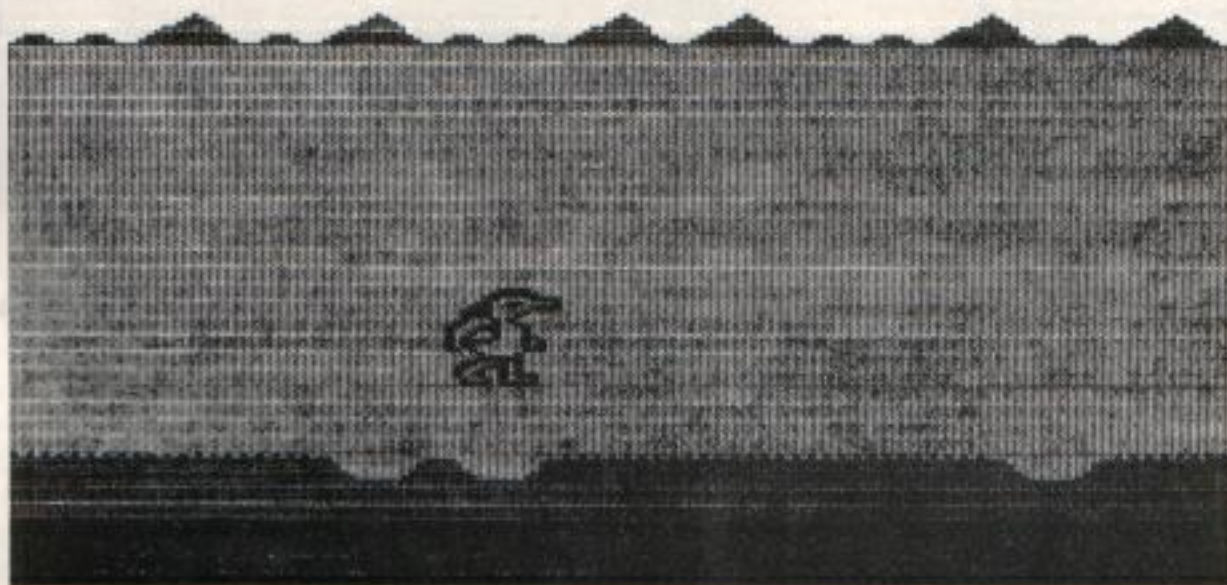
1020 IF INKEY-67 AND O%<16 O%=O%+1:M%
=-1
1030 count=count+1:IFcount=100 PROCne
xtlvl
1040 NEXT S%
1050 UNTIL FALSE
1060 DEF PROCnextlvl
1070 PROCbonus
1080 T%=T%+1
1090 IF T%=7 PROCcongrat:T%=1
1100 S%=1
1110 PROCscreen:O%=1:P%=25
1120 PROCheader
1130 COLOUR1
1140 count=0
1150 PROCstart:ENDPROC
1160 DEFPROCscreen
1170 VDU19, 3, 4, 0;
1180 VDU28, 0, 29, 19, 16:COLOUR130:CLS:V
DU28, 0, 15, 19, 0:COLOUR131:CLS
1190 VDU26:COLOUR1:FOR A=0 TO 19:VDU3
1, A, 29, 230:NEXT
1200 ENDPROC
1210 DEFPROCstart
1220 BX%=19:BY%=27:OBX%=19:OBY%=27:QX
%=11:QY%=27:OQX%=11:OQY%=27
1230 O%=1:P%=25:OI%=1:P1%=25
1240 COLOUR131:PRINTAB(X, Y);A$
1250 COLOUR130
1260 IF T%=1PRINTAB(CX, OY):C$:PROCTu
nel
1270 IF T%=2PRINTAB(CX, OY):E$
1280 IF T%=3PRINTAB(CX, OY):G$
1290 IF T%=4PRINTAB(CX, OY):I$
1300 IF T%=5PRINTAB(CX, OY):I$
1310 IF T%=6PRINTAB(CX, OY):I$
1320 FORZ=1TO3
1330 SOUND1, -15, 100, 3
1340 COLOUR0:VDU31, O%, P%, 231, 232, 8, 8,
10, 233, 234, 8, 8, 10, C1%, C2%
1350 FORA=1TO500:NEXT
1360 COLOUR2:VDU31, OI%, P1%, 231, 232, 8,
8, 10, 233, 234, 8, 8, 10, C1%, C2%
1370 FORA=1TO500:NEXT
1380 NEXTZ
1390 ENDPROC
1400 DEF PROCcongrat
1410 COLOUR128:CLS:COLOUR1
1420 PRINT"" Well done!":COLOUR
2:PRINT""You found the chest!"
1430 COLOUR3:PRINT"" Press space fo
r"" another go."
1440 *FX21
1450 LEV%=LEV%+1
1460 REPEAT:PROCTunel:UNTILINKEY-99
1470 ENDPROC
1480 REM Tunel
1490 DATA 108, 96, 108, 96, 100, 88, 100, 88
, 96, 80, 88, 108, 96, 80
1500 DATA-1
1510 DEFPROCTunel
1520 RESTORE1490
1530 READpitch
1540 IFpitch=1 ENDPROC
1550 SOUND1, -15, pitch, 2
1560 FORZ=1TO130:NEXT
1570 GOTO1530
1580 REM Tune2
1590 DATA 52, 60, 68, 60, 52
1600 DATA -1
1610 DEFPROCTune2
1620 RESTORE1590
1630 READpitch
1640 IFpitch=1 ENDPROC
1650 SOUND1, -15, pitch, 2
1660 FORZ=1TO130:NEXT
1670 GOTO1630
1680 DEFPROCdead
1690 COLOUR130:COLOUR0:VDU31, O%+3, P%,
244, 245, 246, 247

```



SCORE 211

HIGH 211





```

1700 FORA=1TO500:NEXT
1710 PROCtune2
1720 FORA=1TO1500:NEXT
1730 LI=LI-1
1740 IFLI=0 PROCsprog
1750 S=1
1760 PROCscreen:O=1:P=25
1770 PROCheader:COLOUR1
1780 PROCstart:ENDPROC
1790 DEFPROCheader
1800 COLOUR0:VDU31,0,2,231,232,8,8,10
,233,234,8,8,10,235,236
1810 VDU31,5,2,240,241,8,8,10,242,243
1820 PRINTAB(9,2);"SCORE";TAB(9,5);"
HIGH"
1830 ENDPROC
1840 DEFPROCbonus
1850 FORA=200 TO 255 STEP4:SOUND1,-15
,A,1:NEXT
1860 FORA=1TO1200:NEXT
1870 COLOUR128:COLOUR2:CLS:PRINTAB(3
,15);"Bonus ";T%;" X 100"
1880 SC=SC+T*100
1890 FORA=1TO1600:NEXT
1900 ENDPROC
1910 DEFPROCsprog
1920 COLOUR128
1930 CLS
1940 COLOUR2
1950 IF HI2> HI2% PROCsupersprog
1960 HI2=HI%
1970 FORA=0TO19:PRINTAB(A,3);"":NEX
T
1980 FORA=0TO19:PRINTAB(A,29);"":NE
XT
1990 FORA=3TO28:PRINTAB(0,A);"":NEX
T

```



```

2000 FORA=3TO28:PRINTAB(19,A);"":NE
XT
2010 VDU28,1,28,18,4
2020 FORA=1TO 44:COLOUR3:PRINT"SPROG!
";:NEXT
2030 COLOUR2
2040 PRINTAB(6,1);"SPROG!"
2050 PRINTAB(1,5);"By Graham Barlow"
2060 PRINTAB(5,7);"(c) 1986"
2070 PRINTAB(5,11);"Today's"
2080 PRINTAB(2,13);"Super Sproger"
2090 PRINTAB(7,15);"is"
2100 PRINTAB(5,17);NAME$
2110 PRINTAB(2,19);"who scored ";HI2
%
2120 PRINT"" Press space"
2130 *FX21
2140 REPEATUNTILINKEY-99
2150 O=0:OY=28:O=1:P=25:O1=1:P1=
25:T=1
2160 C1=235:C2=236:M=1:count=0

```

```

2170 BX=19:BY=27:OBX=19:OBY=27:OX
=11:OY=27:OGX=11:OGY=27:OX=18:CY
=26:OCX=18:OCY=26:LI=3:SC=0:LEV=0
2180 VDU26
2190 ENDPROC
2200 DEFPROCsupersprog
2210 PROCtune1
2220 COLOUR2
2230 PRINT"" You are the new"
2240 COLOUR1
2250 PRINT"" Super Sproger"
2260 COLOUR3
2270 PRINT"" Type in your name"
2280 *FX21
2290 INPUTAB(6,15)"" NAME$
2300 IF LEN(NAME$)>6 CLS:COLOUR2:PRIN
TAB(4,15)"Too long!";TAB(0,19)"Max. 6
characters.";VDU7:FORA=1TO2500:NEXTW:
CLS:COLOUR1:PRINT"" Try again.";GOTO2
270
2310 CLS:ENDPROC
2320 DEF PROCinst
2330 CLS
2340 PRINT""-----SPROG !-
-----"
2350 PRINT TAB(7,4);"By Graham Barlow
(C) 1986"
2360 PRINT""Sprog is looking for a ma
gic treasure""chest to finance his fu
ture adventures""You start off with 3
Sprogs and must""avoid falling into
holes or being hit""by rolling stones
"
2370 PRINT""KEYS :""- Z - ..... ru
n left""- X - ..... run right""- RET
URN - ..... jump""
2380 PRINT""Press space to Sprog!":RE
PEATUNTILINKEY-99
2390 ENDPROC

```

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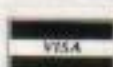
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# MICRO MESSAGES

## Going for the big one...

I HAVE finally made that great decision which becomes harder to make with the appearance of each issue of your excellent magazine – at last I'm going to buy a new computer.

I have great faith in Acorn computers and I could not live without BBC Basic, so I have decided to buy something from the Master series. I have noticed a lot of Master 128s being sold cheaply second hand. Does this mean there is a fault of some sort?

I want to buy a computer for which good quality software is available, but I have noticed that in most advertisements there isn't a section for the Master, but instead it states that the software is Master compatible. Does this mean I would just be buying the BBC Micro versions?

I haven't heard much about the Master Compact since it was released, but there does seem to be a lot of software specially made for it, so would I be better off buying this?

Finally, I recently bought a printer dump rom for my uncle's BBC Micro which I have on long term loan. After performing open heart surgery on my dream machine I got it to work and am now capable of printing

pieces of my own work. However, I would like to be able to print screens from commercial software.

The rom is activated by the command \*OIMAGE. I know it is possible to program a key to call a routine from within a game, as your Snapshot utility does just that. – **Henry Coles, Keighley, West Yorkshire.**

● Both the Master and Master Compact are alive and thriving. There is nothing wrong with either. They are very similar and are supported by a large range of software. Most of the games are identical to the BBC Micro versions, but occasionally Master versions contain extra music or graphics.

It's a matter of personal preference which micro is best, but a point to bear in mind is that the Master has a built-in tape facility, but the Compact can't be used with a cassette system. This could be a serious limitation if you regularly use tapes or tape-based software.

You could try replacing the SAVE command in Snapshot with OIMAGE and see what happens. If you're lucky the screen will be dumped to the printer. Note that it won't work with all software.

## A better boot for View

I HAVE a 64k Electron equipped with a double disc drive system and use Acornsoft's View word processor for all my correspondence. I have constructed a !Boot file for all my word processor discs that call up View which sets the machine to Mode 3, accesses shadow ram as a printer buffer, loads your excellent Printer Driver and programs the function keys to my requirements.

This serves me very well, but I would like to improve it even further, and as yet I have been unable to achieve the desired enhancements. I want to switch off Caps Lk and disable the Break key on startup – always a source of heartache.

Could you tell me what I have to put in my !Boot file to do this? – **J. Buckler, RAF, Laafbruch.**

● You need to use \*FX202,x to set the Caps

Lk key. Bit three of x is set to one if Shift is pressed, bit four is zero if Caps Lk is on, bit five is zero if Shift lock is on, bit six is one if Control is pressed and bit seven is one if Shift is enabled. If a "lock" key is pressed Shift reverses the lock. The command you want is \*FX202,16.

You can't totally disable the Break key, but you should find that it has no effect apart from taking you back to the command page. View automatically recalls your text from memory and no harm is done, so we can't see what your problem is here.

## Outstanding service

MAY I, through your publication, offer this praise for Pres. I have recently taken to using my Electron on a much more intensive basis than before, and ordered the AP3 disc

drive package from Pres. Within a week it had arrived, and very good it is too.

I ordered a View rom cartridge in the period running up to Christmas, and it arrived within 10 days. I had problems using some of the utility programs on the Welcome disc supplied with the AP3.

Despite the possibility that I may have caused the corruption of the disc myself, without quibble Pres suggested I send the disc back with only a minimal charge to cover postage and so on. They even recovered the program I had created as an experiment.

A firm that takes such good care of its customers deserves to be publicly praised and encouraged. – **Martin Rowley, St. Albans, Hertfordshire.**

## Giant leap forward

I BELIEVE that development of the Electron has taken a great step forward with the introduction of Slogger's new Remote Expansion. No longer need an Electron computer system be an ever-increasing jumble of electronic boxes joined by writhing snakes coming from the plug in points, but it can easily become an elegant and functional computer system similar to the classic IBM PC.

Not only does the concept of remotely packaging all additional parts tidy up the working area, but it also eliminates the dreadful prospect of disturbing the cartridge-based add-ons in the excitement just before becoming Elite.

However, even Slogger's new masterpiece is capable of a little further improvement. The Remote Expansion has its own mains on/off switch at the back which controls the mains power to the computer and disc drive. No doubt, most of us use our Electrons with conventional TV or monitor displays, often a printer and possibly a cassette recorder.

Within the unit there is provision for the signal lines to these units, but not for the mains power supplies. But don't despair. The mains wiring can easily be tidied up by fixing an extension cable connector onto the back of the Remote Expansion and wiring it into the mains switch provided by Slogger.

A suitable mains distribution board would seem to be that available from Maplin – part number RW68Y costing £6.95.

I have discussed the concept of the additional power distribution board on the

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#### ◀ From Page 49

back of the unit with Andrew Hilbig of Slogger and received his blessing. The switch provided is rated at 10A and there is space for the board to be screwed on to the back of the unit.

The mains connections will have to be soldered on to the switch, but similar wiring operations are necessary to incorporate the Electron and disc drive power supplies in to the Remote Expansion. — **Peter Hills, Princes Risborough, Buckinghamshire.**

## Bigger windows

MYsetup is a Rombox Plus, Starstore, a Citizen 120D printer and an Electron which I have owned for six years. Please could you publish a screen dump for my printer, as I have made several attempts but failed miserably.

From your April 1988 issue I typed in the Squash program which allows 40 characters in Mode 5. When I try to create a text window it will only allow it to have 20 characters across, which is half the screen. Can it be expanded to allow more than this? — **Steven Elkins, Brandleholme, Bury.**

● Unfortunately the Electron still thinks the screen is 20 characters wide — the standard Mode 5 size. You can't really get round this, so it's best to forget about windows and simply print on the screen as usual.

We haven't used a Citizen 120D printer so we'll have to ask our talented readers to supply a screen dump.

## Lost for a few words

I AM an Electron addict and compulsive reader of your magazine, not to mention attendant of the exhibitions.

With the help of both the magazine and exhibitions I have a Plus 1, Cumana interface and 3.5in drive. Also View and a Panasonic KX-P1081 printer. For the display I use a 14in Akai with teletext and RGB.

Today, after using all of these very happily for nearly a year, I have a serious problem when printing. The text is corrupted by leaving out letters and spaces at irregular intervals. Also the tabulation is unreliable. View works, however, when printing to the screen.

The printer Power-on and On-line lights

work as normal, and the platter turns OK. The plugs on the printer lead seem to be in order.

The only possible clue I can find is the plug to the Plus 1. This can work loose and needs pushing in each time before switching on. Usually, the printer lead is kept plugged in, but on one occasion it had been disconnected (while switched off). Is it likely that it could have moved while the printer and micro were switched on?

What can I do about this problem? I feel absolutely lost without my word processor. Handwriting is not my strong point. — **P. Bis-sell, Southend-on-Sea, Essex.**

● Tracking down problems like this is easy if you have a friend with a similar set-up, then you can swap printers, cables and so on and see if it makes any difference.

From what you say, we would first suspect the plug on the printer lead that fits into your Plus 1. Strictly speaking you shouldn't plug in or unplug things when your micro is switched on. However, having said that, we've been plugging in switched on printers to our Electron for five years and haven't had any problems, so this is unlikely to be the cause.

The plug on the lead has probably worked loose and a replacement may be the simplest and cheapest solution. Try a friend's lead and check that this cures the fault first. If this doesn't help, try his printer, then Plus 1 until you find the faulty item.

## Looking for a printer

I BOUGHT my first copy of Electron User today and I have to say I was very impressed. I've had my Electron for about three years now and I'm interested in buying a printer for it. Can you tell me which is best? — **Angel Walters, Newark, Notts.**

● The Brother HR5 is popular with many readers as it is very cheap — it can often be found for less than £100. However it is a thermal transfer machine and though the quality is good enough for listings for your own use, for letters and documents you would be best served by something like the Panasonic KX-P1081 at £179. Its output is excellent and it offers a wide variety of print styles.

It never ceases to surprise us when we hear of Electron owners who have had their micro for several years, but have only just discovered Electron User. We're well into volume six, yet there are still many Electron owners who are missing out on this mine of information. Spread the word!

almost certainly be the result of your own typing mistakes.

Unfortunately we can no longer answer personal programming queries concerning these mistakes. Of course letters about suggested errors will be investigated without delay, but any replies found necessary will only appear in the mail pages.

## Supporting role

I FEEL I must write in support of those correspondents who have asked you not to succumb to requests for more games, reviews, cheats and so on.

Being 70+ it probably takes me longer than a younger person to digest technical articles, but I have found them to be of immense value in helping me to understand and adapt for my own purposes the extremely useful utilities and other programs which you print.

My Electron is supported by a Plus 3, Rombox Plus, View cartridge and Panasonic KX-P1081 printer which I find excellent for word processing.

The View printer drivers you have published are very good, but I find the VPD program and supporting article in the September 1988 issue of your sister publication, The Micro User, to be more versatile.

I know there are sideways ram cartridges for the Electron, but where can I get it in chip form to fit into the rom sockets in my Rombox Plus?

Your Rainbow design utility (February 1988) has interested me lately, and I have used your screen dump (June 1986) to print the screen. My method may not be very elegant, but it works. Ideally, perhaps an extra box for PRINT or DUMP should be added to the existing SAVE and LOAD boxes, but by adding:

```
865 GOTO 128:MOVE 1279,1023:MOVE 0,92
7:PLOT83,0,1023:MOVE1279,927:MOVED,927
:PLOT 83,1279,927866MOVED,0:MOVE1279,0
:PLOT83,0,96:MOVE1279,96:MOVED,0:PLOYB
3,0,96867CALL 690A
```

all the boxes will be cleared to the background colour after saving and the screen dump will be called.

I find that the EDump program suits my Panasonic printer for Modes 2 and 5, but a more refined pattern is provided by adapting it to Mode 1 as follows:

```
300 LDA#76:JSR oswrch
320 LDA#192:JSR oswrch
340 LDA#3:JSR oswrch
920 *SAVE ECODE1 900 9FF 90A
```

I sometimes use my grandson's Atari 520STFM for word processing, but the results are no better than with my humble Electron. — **E. Evans, Llanelli, Dyfed.**

## Key to the problem

IN chapter 24 the Electron manual tells you how to use the programmable function keys, but does not tell you the numbers to use. It gives them for Break and a couple of others, but not for the rest. Could you print them or tell me where I can find them?

Is Slogger's T2P3 a rom cartridge or a rom chip, because the advert does not state clearly? — **Nick Smith, Arnold, Nottinghamshire.**

All programs printed in this issue are exact reproductions of listings taken from running programs which have been thoroughly tested.

However on the very rare occasions that mistakes may occur corrections will be published as a matter of urgency. Should you encounter error messages when you type in a program they will



● The function keys are printed in light brown on the front of the number keys, and the key number is the same as the number on the key. The only exceptions are the cursor, Copy and Break keys which can also double as function keys after a \*FX4,3.

The Copy key is \*KEY11, and the left, right, down and up cursor keys are \*KEY12, \*KEY13, \*KEY14 and \*KEY15 respectively.

T2P3 is a rom chip, not a cartridge.

## Wiping out errors

THERE was a mistake in the January 1989 issue of *Electron User*. Roland Waddilove's article *Disc wipe out* has a machine code \*WIPE program, and line 680 reads EQU0 0, but this doesn't work. However, if you change it to EQU0 0 the program runs without any trouble at all. — A. Ross.

● Our master copy reads EQU0 0 and this works fine, so we can't understand why yours shouldn't. It is possible that you have made a mistake elsewhere in the program and the EQU0 0 fixes it.

## Consider a clean up

I AM an avid reader of *Electron User* and have had an *Electron* for four years. I enjoy programming and used to be able to save the routines, but for the past couple of months I have not been able to save and later retrieve them. I can't even save my own Repton screens from the screen designer.

I have tried the Cassette Verify program (10 Liners, November 1987), but to no avail. I have also tried removing the ear plug so that no interference is picked up by the mic plug, and saving and reloading without my Bud joystick interface fitted. — Merlin Fox, Canterbury, Kent.

● Try cleaning the read/write heads of your cassette recorder, then adjust the azimuth. The December 1988 issue of *Electron User* contains a feature explaining how to do this.

## Speedy Basic solution

I HAVE a useful tip for people who want to speed up their Basic programs. Just type:

!&900=&60586078

CALL &900 enables the speed-up effect and CALL &902 disables it. The code can be relocated to any spare four-byte position. This gives greater speed to the currently running program by turning off interrupts. This means that for effective use the code must be dis-

# Business add-ons

I HAVE an *Electron* computer and have been using this with a TS.80 tape recorder to save programs. I now wish to use a disc drive, spreadsheet and database for business.

Could you tell me what extras I need to do this — Plus 1, disc drive type, roms and so on? — T. Gentry, Beverley, Humberside.

● There are many alternative set-ups, so you should shop around for the best prices. Both Slogger and Pres can supply a Plus 1 or Rombox Plus, disc interface and drive. Go for an E00 DFS, as the extra

memory available over an ADFS is useful in business applications.

Viewsheets on rom cartridge is the best spreadsheet, and Slogger's rom-based Starstore II is a good database.

Two essential business items you have missed off your list are a word processor and printer; the latter is also essential for use with the spreadsheet and database. Acornsoft's View, or Slogger's Starword — both are very similar — are good word processors, and Amstrad and Panasonic have a range of high quality, low price printers.

abled before the program tries to read the keyboard or access the TIME function and reenabled afterwards.

The speed increase given to some programs, notably *Return to Moonbase Alpha*, is quite impressive. — A. Taylor, Gillingham, Kent.

## Controlling a robot

I AM examining the possibility of trying to use the user port of the *Electron* to control external applications such as a small robotic arm. Could you please tell me the hex address in the *Electron*'s memory of the user port?

Do I require the Plus 1 or other add-ons so I can access the 0V ground, 5V input and output pins, as I have not been able to find this information in the user guide or your Memory Map article?

I am considering learning another programming language such as Pascal, Fortran or Cobol, but most important, Pascal. Is there any way of making it possible for the *Electron* to be programmed in Pascal or another language, via perhaps, a Plus 1 cartridge or rom chip?

Finally, how can a mouse be added to the *Electron*? Do I need an RS423 interface and is there a special memory address for this? — Thomas How, Berkhamsted, Hertfordshire.

● Adding a robot arm and controlling external hardware is quite a complicated process and you'll first need a Plus 1 and user port. The *Electron* has not got a user port built in — so it couldn't feature in the Memory Map article — but Slogger and Pres should be able to supply these items.

Don't be tempted to plug things straight into the back of the micro, as it is quite easily damaged. If you are fairly competent with a soldering iron you could build your own user port by following Joe Pritchard's Hardware Projects series in the August 1988 to March 1989 issues of *Electron User*.

The only programming language available

on your list is Pascal. Acornsoft produced two versions, one on rom cartridge and the other on tape. However, they may be quite difficult to find, as they are in short supply.

Lisp and Logo, two alternative languages, are more readily available on rom cartridge and are worth considering if you can't get hold of Pascal.

You don't need an RS423 for a mouse, and there isn't a memory address associated with it. Pres or Slogger should be able to supply you with the correct hardware and software.

## Teletext Electron

DID you know that it is possible to have the full 64 character teletext graphics on an *Electron*? Executing the following short piece of code defines an array TS in such a way that the statement:

PRINT TS(n)

where n is between 0 and 63 will print the required character:

```
10 REM Teletext graphic characters
20 MODE6
30 DIM TS(63)
40 FOR N=0 TO 31
50 VDU 23,N+160
60 FOR L=0 TO 14 STEP 2
70 R=L DIV 5*2 : VDU -56*(N AND 2^R)-7*(N AND 2^(R+1))-O)
80 NEXT
90 TS(N)=CHR$(N+160)
100 PRINTN+160;TS(N)
110 NEXT
```

The graphics are numbered in the standard order as in Mode 7 on the BBC Micro. — T. Lascelles, Portsmouth.

● This clever program is based on the fact that the teletext graphic character shapes are based on a simple mathematical formula. So it is possible to simply calculate the VDU codes with a little arithmetic rather than store dozens of lines of VDU statements.



# COMPUTING IN **ACTION**

**Emulate Keates - turn out verse after verse with Julie Boswell's composition generator**

It has often been said that if you sit a monkey at a typewriter and allow it to hit the keys randomly eventually it will come up with the complete works of Shakespeare.

It might take a long time, but as Shakespeare's works are merely strings of characters the monkey may eventually hit on that random combination - it's just as likely as any other random choice of characters.

Alternatively, if you typed into your micro all the words in the dictionary and then got it to repeatedly print them out in a random order it would eventually produce a piece of text to rival the Poet Laureate's best efforts. For to a computer, a poem, is simply a collection of random words found in a dictionary.

However, two immediate problems prevent us from producing beautiful prose on our micros. The first is that we can't fit all the words in the dictionary into our Electron's 32k memory. The second is that it may take hundreds of years to come up with the right combination of words.

Is there a solution? Yes. What we can do is provide the Electron with a much shorter list of words and give it a form of artificial intelligence so that it can link them in sen-

## Poetic injustice

tences. The result isn't perfect, but it is surprisingly good.

The program listed here, called Poetry, generates a never ending supply of original prose. It may not be up to Poet Laureate standard, but you'll be amazed at what it can do with such a small database of words.

Poetry uses this following "formula" to write the poem:

TITLE: Adjective + noun  
LINE 1: Adjective + noun(plural) +  
adverb + verb(plural) +  
adjective + noun(plural)  
LINE 2: Adjective + noun(plural) +  
verb(plural) + adverb +  
adjective + noun(plural)  
LINE 3: Article + noun + verb +  
preposition + article +  
adjective + noun  
LINE 4: Noun(plural) + verb(plural) +  
conjunction + article + noun

It has short lists of adjectives, verbs, nouns and so on that it can call up. For the title it



selects an adjective at random from its list, and follows it with a random choice of noun. The first line is a random adjective, then a noun, adverb, verb and so on, each chosen at random from its list.

The panel shows the sort of output you can expect. Is it poetry or is it nonsense? I'll leave it to you to decide. Whatever your thoughts, it's both fascinating and highly entertaining to watch.

You may like to add to its repertoire of words to increase the variety of prose generated. Simply add as many words as you like to the data statements at the end of the listing. The number of words in each data statement is stored as the first item in the line so don't forget to alter this too.

```

10 REM Poetry
20 REM By Julie Boswell
30 REM (c) Electron User
40 MODE 1
50 VDU 19,1,6;0;
60 REPEAT
70 CLS
80 COLOUR 3
90 REM title
100 PRINT
110 PROCword(1)
120 PROCword(2)
130 PRINT
140 PRINT "-----"
150 PRINT

160 COLOUR 2
170 REM Line 1
180 PROCword(1)
190 PROCword(2):PRINT "s";
200 PROCword(3)
210 PROCword(4)
220 PROCword(1)
230 PROCword(2):PRINT "s"
240 PRINT
250 COLOUR 1
260 REM Line 2
270 PROCword(1)
280 PROCword(2):PRINT "s";
290 PROCword(4)

300 PROCword(3)
310 PROCword(1)
320 PROCword(2):PRINT "s"
330 PRINT
340 COLOUR 2
350 REM Line 3
360 PROCword(5)
370 PROCword(2)
380 PROCword(4):PRINT "s";
390 PROCword(6)
400 PROCword(5)
410 PROCword(1)
420 PROCword(2):PRINT
430 PRINT
440 COLOUR 1
450 REM Line 4
460 PROCword(2):PRINT "s";
470 PROCword(4)
480 PROCword(7)
490 PROCword(5)
500 PROCword(2):PRINT
510 PRINT
520 COLOUR 3
530 INPUT "Press RETURN...";a$
540 UNTIL FALSE
550 END
560 E
570 DEF PROCword(w$)
580 PRINT " ";
590 IF w$=1 THEN RESTORE 750
600 IF w$=2 THEN RESTORE 780
610 IF w$=3 THEN RESTORE 810
620 IF w$=4 THEN RESTORE 840
630 IF w$=5 THEN RESTORE 870
640 IF w$=6 THEN RESTORE 900
650 IF w$=7 THEN RESTORE 930
660 READ n

```

### Fragrant rose

Slender tulips randomly blow delicate perfumes  
Slender perfumes aim gently colourful daffodils  
A petal blows within the colourful dream  
Dreams float after the daffodil

Fragrant daffodils randomly steer slender tulips  
Colourful scents wave extremely clear daffodils  
The dream steers to the bright perfume  
Roses blow towards the flower

Misty scents smoothly aim slender perfumes  
Colourful scents wave randomly colourful petals  
A daffodil drifts from the delicate daffodil  
Petals float after the perfume

Press RETURN...?

```

670 FOR i=1 TO RND(n)
680 READ w$
690 NEXT
700 IF COUNT=1 THEN w$=CHR$(ASC(w$)-
32)+MID$(w$,2)
710 IF COUNT+LEN(w$)>38 PRINT
720 PRINT w$;
730 ENDPROC
740
750 REM Adjective
760 DATA 7,"misty","clear","fragrant",
"colourful","delicate","bright","sle
nder"
770
780 REM Noun
790 DATA 8,"scent","perfume","daffod
il","tulip","flower","petal","rose","d
ream"
800
810 REM Adverb
820 DATA 6,"superbly","extremely","g
ently","randomly","breathlessly","smoo
thly"
830
840 REM Verb
850 DATA 7,"wave","blow","drift","fl
oat","wander","steer","aim"
860
870 REM Article
880 DATA 2,"the","a"
890
900 REM Preposition
910 DATA 3,"to","from","within"
920
930 REM Conjunction
940 DATA 7,"against","before","after",
"towards","away from","above","below"

```



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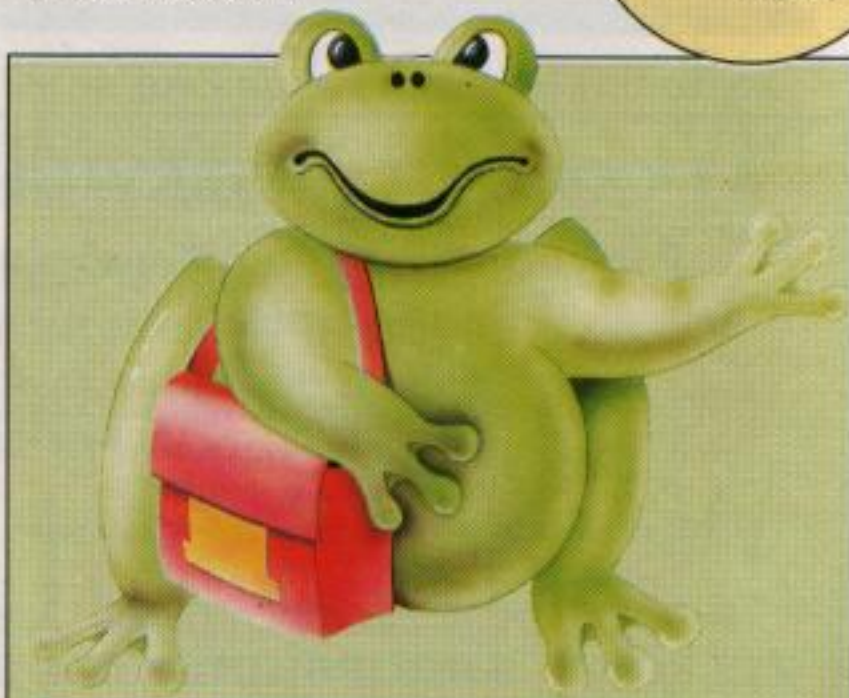
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fun

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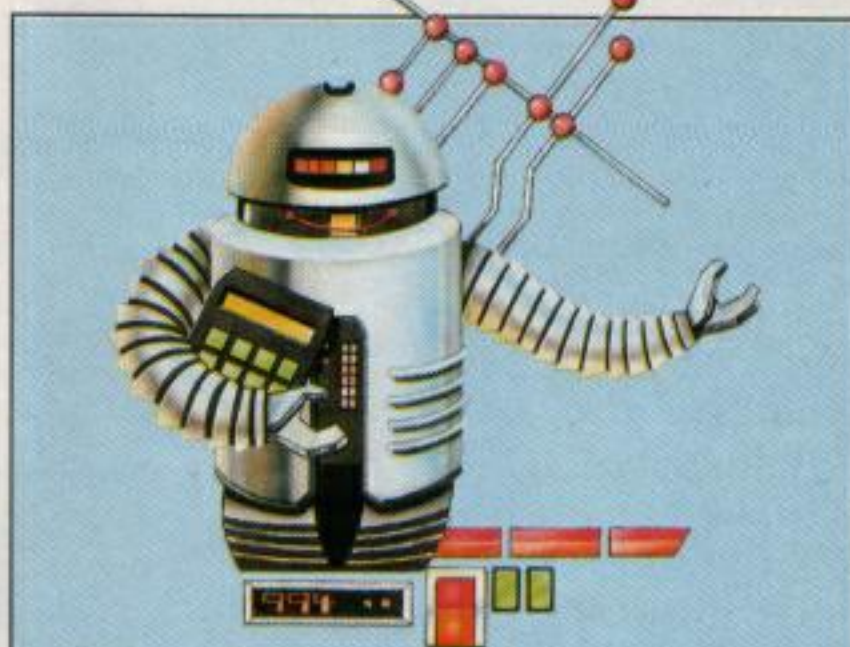
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2

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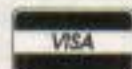
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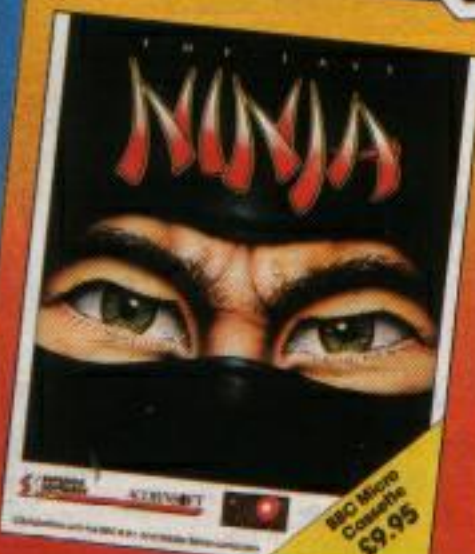
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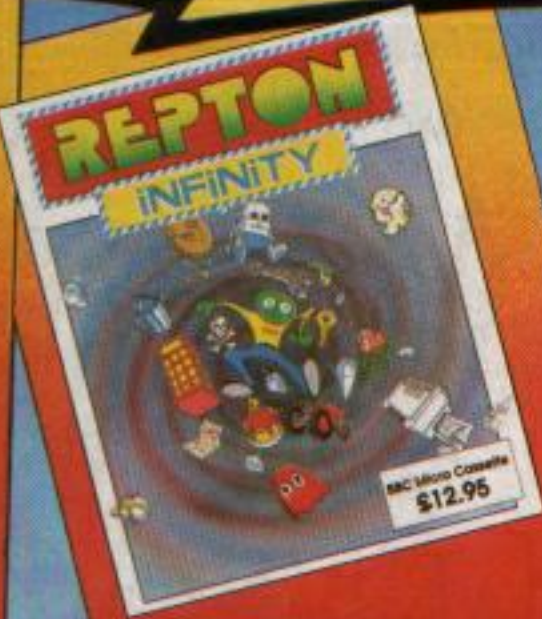
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